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CONGENITAL DENTAL DEFECTS IN INFANTS SUBSEQUENT TO MATERNAL RUBELLA DURING PREGNANCY.

By MERVYN W. EVANS, D.D.Sc., B.D.S. (Adelaide),
Adelaide.

THE association of congenital defects in infants with maternal rubella during pregnancy is now well established (Gregg,[1] Swan *et alii*[2][3]). Recently Tostevin (see Swan[4]) observed that the teeth of some of the children comprising the South Australian series appeared to be abnormal. Accordingly, I was asked to undertake dental examinations of the series. It is emphasized that only part of the results and findings recorded in this paper are final, and that further work over a longer period of time will be necessary before the dental picture is complete.

Plan of the Investigation.

The parents of each infant were questioned with regard to (*a*) the time of eruption of the teeth, especially the first, and (*b*) the occurrence or otherwise of convulsions.

Each child was examined from the point of view of such dental defects as (*a*) variation in the number of teeth from normal; (*b*) hypoplasia; (*c*) abnormal tooth form; (*d*) restricted arch formation; (*e*) dental caries; and (*f*) gingivitis.

For the purposes of comparison, the abnormalities, such as hypoplasia, dental caries *et cetera*, have been graded: "–" (negative), "+" (mild), "++" (moderate) and "+++" (severe), according to their extent. (For convenience the case numbers adopted in earlier papers[2][3] have been retained.)

Results.

It is generally conceded[5] that the primordia of the teeth (the dental laminæ and their bud-like thickenings, the enamel organs) are first detectable in the sixth week of embryonic life, that the dental papillæ first appear at nine weeks, and that the onset of calcification is at the twentieth week of intrauterine existence. On this basis, the series has been arranged in order of the development of rubella during pregnancy, and divided into three groups (Table I). Group A comprises the cases in which the exanthem occurred before the sixth week of pregnancy, Group B the cases in which the disease was contracted between the sixth and ninth weeks, and Group C the remainder.

Of the 34 patients examined, 23 (Cases 1, 2, 64, 4, 5, 65, 8, 10, 12, 13, 14, 15, 66, 67, 16, 17, 21, 22, 26, 28, Z, 40 and 42) showed evidence of one or more dental defects. Five of the 23 exhibited only minor disturbances, of the following nature: (*a*) restricted arch formation (Cases 4 and 5); (*b*) mild hypoplasia (Cases 28 and 40); (*c*) slight retarded eruption and restricted arch formation (Case 67). Although these cases are considered in conjunction with those of the series in which the subjects were more severely affected, the fact that they are border-line cases should not be overlooked. The observations made and inferences drawn from them are discussed under the headings mentioned earlier.

Retarded Eruption.

The "eruption grading" (Table I) is based on the time of appearance of the first and subsequent teeth. (The normal period of eruption of the first tooth ranges from the sixth to the ninth month.[6]).

The "eruption index" depends on the proportion of teeth actually erupted to the number which should have been present at the particular age at which the infant was examined. (In a normal case the index recorded would naturally be 1.) Some of the children were three and four years of age when the dental examination was conducted, so in these cases the "index" was of little value in assessing the rate of eruption. For instance, in Case 10 the child was forty-two months old when examined; the first tooth did not appear until fourteen months, and although an index of 1 was recorded at the time of examination, the index may and probably would have been < 1 during the nine to thirty month period. Other cases with similar age and "index" include Cases 62, 64, 5, 12, 66 and 28.

TABLE I.

Analysis of Congenital Dental Defects in Infants Subsequent to Maternal Rubella in Pregnancy.

Case Number and Sex.	Number of Months Pregnant at Onset of Rubella in the Mother.	Associated Defects.	Age of Infant in Months at Time of Dental Examination.	Dental Defects.									
				Eruption.			Hypoplasia.	Tooth Form Abnormality.	Restricted Arch Formation.	Caries.	Gingivitis.	Convulsions.	
				First Tooth Eruption in Months.	Grading.	Eruption Index.							
62. M.	Early in pregnancy.	Deaf-mutism.	45	9	−	1	−	−	−	−	−	−	Group A.
1. F.	Not > 3/4	Bilateral cataract, heart disease, probable mental deficiency.	33	12		14/20	+	+ (pointed)	−	−	−	−	
2. M.	3/4	Bilateral cataract, heart disease, probable mental deficiency.	20	9	−	1	+	+ (incisal edges)	−	−	−	−	
64. F.	3/4	Left-sided cataract.	10	No teeth as yet.	+	0/2	−	−	−	−	−	−	
4. F.	7/8	Left-sided cataract, heart disease.	44	9	−	1	−	−	+	−	−	−	
5. F.	1	Deaf-mutism, heart disease.	52	9	−	1	−	−	+	−	−	−	
65. F.	1	Bilateral cataract, heart disease.	11	No teeth as yet.	+	0/2	−	−	−	−	−	−	
8. F.	? 1	Bilateral cataract.	21	No teeth as yet.	+++	0/16	−	−	−	−	−	−	
10. F.	?1½	Heart disease.	42	14	+	1	+	−	+ (lower)	−	−	−	
12. M.	? 1½	Deaf-mutism.	44	11	+	1	+	−	−	−	−	−	Group B.
13. M.	? 1½	Heart disease.	26	8	−	1	−	−	+	++	+	−	
14. F.	1½	Deaf-mutism.	35	10	+	1	−	+ (incisal edges)	−	+	−	−	
15. M.	1½ to 2	Left-sided cataract, *talipes equinovarus*, heart disease.	33	13	++	4/20	−	−	+ (lower)	+	+	−	
66. M.	1½ to 2	Deaf-mutism.	46	11	+	1	++	−	−	+	−	−	
67. F.	1½ to 2	Deaf-mutism.	32	13	+	1	−	−	+	−	−	−	
16. F.	Probably <2	Bilateral cataract, heart disease.	17	8	−	1	++	+ (incisal edges)	−	−	−	−	
17. F.	2	Bilateral buphthalmos, heart disease, probable mental deficiency.	32	23	+++	8/20	−	+ (very pointed)	−	−	−	+	
18. M.	2	Microcephaly.	8	7	−	1	−	−	−	−	−	−	
21. F.	? 2	Deaf-mutism, heart disease.	33	12	++	16/20	−	−	−	−	−	−	
22. F.	? 2	Microcephaly, mentally retarded.	18	10	+	11/16	−	+ (rounded incisal edges)	−	−	−	−	
26. F.	2½	Bilateral cataract.	17	15	+++	2/12	−	−	−	−	−	−	
68. M.	2 to 2½	Heart disease.	9	No teeth as yet.	−	1	−	−	−	−	−	−	Group C.
28. F.	3	Bilateral cataract.	44	7	−	1	+	−	−	−	−	−	
29. M.	3	—	10	8	−	1	−	−	−	−	−	−	
33. M.	3	—	18	8	−	1	−	−	−	−	−	−	
Z. F.	? 3	Microcephaly, unable to sit up (aged 11 months).	12	No teeth as yet.	+	0/4	−	−	−	−	−	−	
34. F.	3½	—	7	6	−	1	−	−	−	−	−	−	
35. F.	3½ to 5	Deaf-mutism.	36	9	−	1	−	−	−	−	−	−	
37. F.	4½	—	23	6	−	1	−	−	−	−	−	−	
40. F.	5½	—	11	5	−	1	+	+ (incisal edges)	−	−	−	−	
41. M.	5½ to 6	Microcephaly.	13	7	−	1	−	−	−	−	−	−	
42. F.	6	—	15	12	+	7/10	−	−	−	−	−	−	
46. F.	7	—	14	6	−	1	−	−	−	−	−	−	
48. F.	8½	—	15	4	−	1	−	−	−	−	−	−	

A. Eruption, hypoplasia, caries and gingivitis are graded
− = normal.
+ = mild abnormality.
++ = abnormality more marked.
+++ = considerable abnormality.

B. Eruption index is equivalent to $\frac{\text{Number of teeth present}}{\text{Number that normally should be present}}$

Of the 23 subjects with dental abnormalities, 16 (Cases 1, 64, 65, 8, 10, 12, 14, 15, 66, 67, 17, 21, 22, 26, Z and 42) exhibited retardation of eruption. Three of the babies (Cases 8, 17 and 26) were severely affected ("eruption grading" = "+++"). Up to the age of twenty-one months the child in Case 8 did not have a tooth. In Case 17 the child was twenty-three months old before her first tooth appeared, while at thirty-two months only eight instead of the normal twenty were present. In Case 26 the child was fifteen months of age before the eruption of her first tooth, and at the age of seventeen months had only two teeth instead of twelve. Other noteworthy examples ("grading" = "++") are Cases 1, 15 and 21. In the first-mentioned case the child was twelve months old before the appearance of the first tooth, and at thirty-three months had only fourteen instead of twenty teeth. In Case 15 the first tooth erupted at thirteen months, at thirty-three months four instead of twenty teeth were present. In Case 21 the first tooth appeared at twelve months; sixteen out of twenty were present at thirty-three months. The remaining ten cases were graded "+".

With three exceptions (Cases 26, Z and 42) all of the sixteen subjects showing retarded eruption were children whose mothers had suffered from rubella during the first two months of pregnancy. In Cases 26 and Z maternal rubella had occurred in the third month of pregnancy and in Case 42 in the sixth month.

The distribution of retardation of eruption *et cetera* in relation to Groups A, B and C is shown in Table II. It will be observed that the retardation in Groups A and B (14 out of 21 cases were "positive") was much greater than in Group C (only two out of thirteen children were affected). Moreover, the average age at eruption of the first tooth was increased in Groups A and B. The five edentulous children (Cases 64, 65, 8, 68 and Z) were too important to be disregarded in the compilation of Table II, and so that at least their minimum effect might be reflected in the averages, it was supposed that the first tooth in each case had commenced to erupt. The figures of Table II can be finalized only when the first tooth in the five cases concerned has erupted.

TABLE II.

Distribution of Retardation of Eruption in Relation to Groups A, B and C. (See text.)

Group.	Total Number of Cases.	Number of Affected Children.	"Eruption Grading" of Affected Children.			Average Age (in Months) at Eruption of First Tooth in both Affected and Normal Cases. (Number of Cases in which Figures are Based are in Parentheses.)
			+++	++	+	
A	9	5	1	1	3	11·5 (9)
B	12	9	2	2	5	11·8 (12)
C	13	2	0	0	2	7·6 (13)

As far as the "eruption index" is concerned, of the eleven cases with an index of less than 1, four occurred in Group A and five in Group B.

Hypoplasia.

Hypoplasia was found in eight instances (Cases 1, 2, 10, 12, 66, 16, 28 and 40); in six of these cases it was only of minor degree, in the remainder it was graded "++". Of the two children moderately affected, the child in Case 66 also showed dental caries. Of the eight cases, three were distributed in Group A and three in Group B.

Pitts[7] records the incidence of hypoplasia in the deciduous dentition of normal infants as approximately 0·4% (15 cases in 4,000). The incidence in the admittedly small series here recorded was about 23·5%.

Abnormal Tooth Form.

Evidence of defective tooth form was present in seven infants (Cases 1, 2, 14, 16, 17, 22 and 40). With one exception (Case 40) the mothers of the children had contracted rubella in the first two months of pregnancy. In every case the incisal third was the part affected; in Cases 1 and 17 the incisal edges lacked magnitude, and came to sharp points like a series of canines, giving a shark-like appearance; in Case 14 the child exhibited a marked labial convexity in the lower anteriors, the incisal edge representing an arc of a circle instead of a straight line; the child in Case 22 showed abnormality in the biting edges of the upper incisors, and in both centrals the edges were rounded in the extreme.

Restricted Arch Formation.

In six of the 34 infants (Cases 4, 5, 10, 13, 15 and 67), all of whose mothers had suffered from German measles during the first two months of pregnancy, there was restriction in jaw development. This ratio (6:34), however, does not differ significantly from that of children whose fœtal life was normal.

Dental Caries.

According to the present-day concept of the disease, dental caries cannot be regarded as a congenital condition; nevertheless " . . . there are strong evidences that the tendency toward dental caries or an immunity to the disease may be transmitted from parent to child, according to the laws of familial inheritance" (Kronfeld[8]). It is not unlikely that a disturbance such as infection during prenatal existence might similarly predispose teeth to the ravages of dental caries. Of the 34 babies of the present series, four (Cases 13, 14, 15 and 66) showed dental caries; in all four cases the mothers had contracted rubella between the sixth and ninth week of pregnancy, and from an embryological point of view this is of decided interest. Four of the six children of this period reveal early caries, but a greater number must be examined before an association between caries and the period of pregnancy is, or is not, substantiated. The proportion (4:34) of cases of dental caries in the present series is higher than that normally found in children up to three years of age, but in view of the small numbers involved too much weight should not be placed on this observation until further work has been performed.

Gingivitis.

In two of the infants (Cases 13 and 15) gingivitis was noticeable; both occur in Group B, and both also show dental caries.

Convulsions.

Questioning of the parents revealed that in two children (Cases 17 and 22) convulsions had occurred; however, neither of these babies had dental hypoplasia. (The two conditions are sometimes associated.)

Discussion.

Earlier Gregg[1] and my colleagues[2] envisaged the possibility that as the babies comprising the series developed, other malformations would become evident. The results of the present investigation show that this prediction has been fulfilled. Of the 26 children of the present series previously found to be suffering from other congenital defects,[2][3] 21 showed congenital dental abnormalities, while of the eight children classified earlier as normal, two exhibited dental defects.

In their series, Gregg[1] and Swan and his associates[2][3] found that congenital malformations were virtually confined to infants whose mothers had suffered from rubella at some period during the first three months of pregnancy. In this respect my experience with the congenital dental abnormalities was essentially similar.

More detailed examination, however, disclosed that, in general, as far as the dental defects were concerned, the greatest deviations from normal were found in babies whose mothers had contracted German measles during what might be termed the "critical" period of dental development, that is, at some period during the sixth to ninth week of pregnancy (Group B). In this group there is retardation of eruption and tooth structure is affected. In Group A there is only evidence of retardation of erup-

tion, whilst members of Group C are relatively free from dental irregularity or defect.

The most striking dental abnormality was retardation of eruption. The physiological basis of eruption of teeth is still a debatable point. The fact that cases with this abnormality occurred in both Group A and Group B leads to the conclusion that rubella may act upon the dental primordia to produce this disturbance even before the production of the enamel organs. It is of interest to note that retarded eruption is found in cases of rickets, syphilis, idiocy and cretinism,[9] and accordingly the fact that rubella is associated with delay in eruption need not therefore occasion surprise. Later, it is intended to determine whether eruption of the permanent teeth is similarly retarded. Except for æsthetic considerations and perhaps the inconvenience caused by the delay, retardation of eruption is of minor importance unless attended by pathological tooth formation.

The other abnormalities included hypoplasia, dental caries and defective tooth form. With regard to enamel hypoplasia, the theory of general acceptance (the collapse theory of Gottlieb (see Kronfeld[10])) is that some force or condition causes the fibrous network to fall down or collapse upon itself between the time of its formation and the commencement of calcification, that is, between the sixth and twentieth weeks. Table I shows that six of the eight cases, including both the "++" cases, occur within this time period.

Further lines of investigation which suggest themselves are the pathological examination of shed or extracted teeth obtained from children comprising the series. The dental pathology of fœtuses aborted by mothers subsequent to rubella in pregnancy and of infants dying from congenital defects following maternal rubella in pregnancy should also be studied.

Summary.

Of 34 babies whose mothers suffered during pregnancy from German measles, 23 exhibited congenital dental abnormalities, in 18 cases major in nature. All except two of the infants with dental defects showed other congenital malformations.

With the exception of two cases, the mothers of all the children with congenital dental abnormalities had contracted rubella at some period during the first three months of pregnancy.

Dental defects were most severe in infants belonging to Group B (the mothers had suffered from German measles between the sixth and ninth week of pregnancy, considered to be the "critical" period of dental development).

The main dental abnormalities comprised retardation of eruption, enamel hypoplasia and dental caries.

Acknowledgements.

My thanks are due to the parents of the children concerned, who so willingly cooperated in this inquiry. I am indebted also to Dr. Charles Swan for his assistance on all occasions, and for his helpful criticism in the compilation of this paper.

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OTITIS EXTERNA IN NEW GUINEA.

By A. F. QUAYLE,
Major, Australian Army Medical Corps.

CONFORMING with the common experience in hot, humid climates, *otitis externa* was prevalent among Australian troops in New Guinea. In a period of twelve months, 736 in-patients were treated for ear, nose or throat conditions (acute tonsillitis and "U.R.T.I." excluded) at one hospital. Of these 736, 188, or 25·5%, were suffering from *otitis media* and 293, or 39·9%, were suffering from *otitis externa*. Thus, 65% of the total disorders were ear conditions. During the same period, of 1,120 patients referred for consultation, 339, or 30·3%, were suffering from *otitis externa*.

It is interesting to compare these figures with those published by Major E. G. Collins, of the Royal Army Medical Corps.[1] Of his 187 patients admitted to the ear, nose and throat ward during a period of five months, 19% were suffering from *otitis externa* and 40% were suffering from *otitis media*; of his 517 out-patients, 16·05% were suffering from *otitis externa* and 17·21% were suffering from *otitis media*.

The following five types of *otitis externa* are recognizable:

1. A moist, eczematous type. This involves the lateral part of the meatus, and tends to spread over the *cavum conchæ* and lobule. Occasionally the deeper part of the external auditory canal is involved. The nature of this condition is not understood; though it did not occur frequently, it proved to be the most intractable type of external otitis, and sometimes took six to twelve weeks to clear up.

2. A dry, scaly type. This involves the meatus and extends slightly on to the skin of the *cavum conchæ*.

3. Furunculosis. This involves the lateral centimetre of the external auditory meatus. This was not a frequent condition, and was sometimes found to be associated with the fifth type of *otitis externa*.

4. Otomycosis. The fungus may form a mass of material, looking like wet, grey, blotting-paper, in the deep canal. This form causes irritation of the skin. More commonly, it occurs as a mould, growing on wax. It does not cause irritation of the skin in this form. This condition is obvious on direct examination. All the specimens of mould examined were a type of aspergillus. Examination of the ears of 200 unselected troops from combatant units revealed the presence of mould in 5%. Both these conditions are easily cured by syringing the ear, drying, and painting the whole of the canal wall with 0·5% gentian violet in 70% *Spiritus Vini Rectificatus* once every second day for three or four applications.

5. Desquamative *otitis externa*. This is by far the most prevalent type, often called "tropical ear". I shall call it desquamative *otitis externa*, as suggested by Temporary Major W. I. Daggett,[2] Royal Army Medical Corps, who described similar cases which occurred in Malta.

Desquamative Otitis Externa.

Incidence.

Nearly 40% of patients admitted to the ear, nose and throat ward, and nearly 30% of patients sent for consultation, were suffering from this condition. The right and left ears were involved about equally, and unilateral lesions were about four times as frequent as bilateral lesions.

It is difficult to estimate the seasonal incidence accurately, as the number of troops and the number of medical units in the area varied. But a comparison of the number of cases of *otitis externa*, with the number of cases of other ear, nose and throat conditions dealt with in the summer and winter, gives the figures shown in Table I. This indicates a greater prevalence in the hotter months.

TABLE I.

Period.	*Otitis Externa.*	Other Conditions.
January to March	135 cases	285 cases
June to August	71 cases	287 cases

Clinical Description.

The condition is a well-defined clinical entity, and runs a characteristic course; it is without doubt similar to that described by Morley[3] and Daggett.[2]

The essentials of the lesion are swelling of the deep canal wall and desquamation of the affected epithelium.

Pain is the most prominent symptom, varying from irritation in the early stages, to severe throbbing or aching in the later stages. Many patients complain of loss of sleep on this account.

Scanty discharge usually occurs after three or four days; but it may be so scanty as not to be obvious to the patient. Swelling of the canal walls always occurs; it is slight in the earlier stages, but increases as the condition progresses, and may obliterate the canal. Sometimes the pre-auricular and post-auricular glands become enlarged and tender, with considerable surrounding œdema. The most constant picture, at some stage, is swelling of the canal walls extending for 1·0 to 1·5 centimetres lateral to the tympanic membrane, and affecting the floor and walls to a greater extent than the roof, which in many cases seems to escape completely. This renders the canal a characteristic shape; it causes a relative deepening of the normal recess, immediately lateral to the tympanic membrane. (The bony meatus is normally at its narrowest 4·0 millimetres from the tympanic membrane.)

The swelling is firm, suggesting some degree of periostitis; it thus differs from the swelling of furunculosis, which is softer, and affects the lateral part of the canal. The swelling of desquamative *otitis externa* is sometimes slow in subsiding, and may persist up to three weeks after the epithelium has returned to normal.

Desquamation becomes apparent by the third day, when the desquamating epithelium appears as white (sometimes greenish) flakes, lining the affected part of the canal. It is adherent, but after a further five or six days separates, often completely. Only infrequently does the epithelium of the tympanic membrane share in the process of desquamation, though usually some degree of myringitis is present. Desquamation leaves a bright, red, smooth wall, which does not bleed. Occasionally the wall assumes this red colour before desquamation occurs. If the condition is untreated, this desquamation may recur, until a moist, soft mass of epithelial debris, pus cells and exudate fills the deep canal.

If the condition is not treated it subsides in about fourteen days, leaving a variable degree of irritation and deafness, but it usually recurs in an acute form within a period of days or weeks; or it may progress to a chronic stage of discomfort, discharge and deafness.

The deafness is of the middle-ear type, and varies in degree from slight to gross, according to the degree of involvement of the tympanic membrane and the accumulation of debris.

In the case of three patients, who denied the existence of any previous ear trouble, when the swelling subsided sufficiently to allow a view to be obtained, a perforation was found in the red, roughened tympanic membrane. No bulging of the tympanic membrane was observed, but a slight mucoid discharge was found. All lesions healed rapidly with treatment.

The question arises whether in some cases a perforation results from ulceration of the tympanic membrane, following an extension of the process from the canal walls.

Ætiology.

That the condition is prevalent in white people living in tropical climates is well recognized. No completely satisfactory explanation is known, though Daggett[2] gives a good commentary on current views.

It had been generally assumed that the condition was due to a fungus. Little was found to support this assumption in cases encountered in this area. Specimens of desquamated epithelium from 25 patients were examined. In 21, no fungal elements were found. In the remaining four, the findings were as follows: (i) a few yeast-like budding organisms, possibly pathogenic; (ii) mycelial elements; (iii) mycelial elements in skin scrapings; (iv) a few non-branching mycelial threads containing endospores.

Clinically, the condition does not look like a fungal infection, and it does not respond well to the usual fungicides, particularly salicylic acid. It would not seem likely that a trychophyton is the cause, as the condition primarily involves the deep canal, an area from which hairs are absent.

Bacteriological Findings.

Culture material from swabbings in 100 cases of *otitis externa* were examined, and these were compared with culture material from 100 normal ears, and with culture material from 100 general wounds (mostly awaiting skin grafting). The results are shown in Tables II and III. In Table II the total incidence of the organisms is given. In Table III the number of cultures which produced one organism only is shown.

It will be noted that *Pseudomonas pyocyaneus* and coliform bacilli did not occur in any of the normal ears examined, and they occurred in only a small percentage of wounds; yet in *otitis externa*, *Pseudomonas pyocyaneus* was present in 65% of cases, and as a pure culture in 51%. Coliform bacilli were present in 16% of cases, and as a pure culture in 9%.

In this series, cases not typical of desquamative *otitis externa*, and indeed some cases frankly belonging to the first and fourth types, were included. As these yielded most of the cultures of *Staphylococcus albus* and *Staphylococcus aureus* cultures, the incidence of *Pseudomonas pyocyaneus* and coliform bacilli in typical cases of desquamative *otitis externa* is actually greater than indicated in the tables.

TABLE II.

Source of Material.	Organism Recovered.							No Growth.
	Staphylococcus albus.	Diphtheroids.	*Staphylococcus aureus.*	*Pseudomonas pyocyaneus.*	Coliform Bacilli.	Streptococci.	*Bacillus proteus.*	
Normal ears[1]	90	48	7	0	0	0	0	2
Otitis externa	20	9	17	65	16	5	4	0
Wounds	36	12	54	11	11	17	28	2

[1] In nearly all cases both ears of one individual yielded identical organisms. *Staphylococcus albus* and diphtheroids occurred in 45. Cultures from 20 Japanese and 20 native ears yielded bacterial flora similar to those of Australian ears.

TABLE III.

Source of Material.	Organism Recovered.						
	Staphylococcus albus.	Diphtheroids.	*Staphylococcus aureus.*	*Pseudomonas pyocyaneus.*	Coliform Bacilli.	Streptococci.	*Bacillus proteus.*
Normal ears	42	3	4	0	0	0	0
Otitis externa	5	0	3	51	9	0	1
Wounds	10	0	24	4	1	1	5

TABLE IV.

Affected Ear. Organisms.	Number of Cases.	Unaffected Ear. Organisms.	Number of Cases.
Pseudomonas pyocyaneus	16	*Staphylococcus albus*	11
Pseudomonas pyocyaneus plus diphtheroids	1	Diphtheroids	1
Pseudomonas pyocyaneus plus Staphylococcus albus	1	*Staphylococcus albus plus* diphtheroids	7
Staphylococcus albus	1	*Staphylococcus aureus*	1
Staphylococcus aureus	1		

TABLE V.

Clinical Material.	Wax. Absent or Scanty.	Wax. Medium.	Wax. Much.	Mould on Medium Amount of Wax.	*Otitis Media.*	*Otitis Externa* in Last Twelve Months.
Australian soldiers	72·0%	12·0%	6·0%	5·0%	0·5%	4·5%
Natives	83·0%	10·5%	2·0%	0·5%	4·0%	0
Japanese	100·0%	0	0	0	7·0%	History not available.

Many of the swabbings were taken within forty-eight hours of the onset of symptoms, some within twenty-four hours.

In 20 consecutive unilateral cases, in which the other ear appeared normal, cultures produced the organisms shown in Table IV.

From these facts it seems probable that the condition is actually a *Pseudomonas pyocyaneus* or coliform bacillus infection of the skin of the external auditory canal. If this is the case, what are the factors which make this skin susceptible to this infection? And why does it affect the deep part of the canal?

Medical assistants of the New Guinea Administration, who have worked among the natives for years, say that the condition is rare among natives. The ears of 200 natives were examined, for comparison with the ears of 200 Australian troops. The ears of 42 Japanese prisoners of war were also examined, and the results are given in Table V, though the number is too small to be of significance. Only two of the Japanese were recent arrivals—the others had been in tropical areas for nine to twelve months.

Accumulation of wax occurred slightly more frequently in Australians than in Japanese or natives. But the difference was scarcely great enough to be of significance. The condition did not occur frequently in men who had an accumulation of wax—rather the reverse, in fact.

It was immediately noted that the external auditory canal of the native was wider and straighter than that of the Australian, so that in many instances a large part of the tympanic membrane can be seen without the aid of a speculum, and without manipulation of the pinna. This provides a ready explanation of why the canal may remain drier in the native—better ventilation would dry up sweat more quickly, and water introduced during swimming or washing would run out more easily.

The external auditory canal of the Japanese seemed, in this small series, to be about midway in size between that of the Australian and that of the New Guinea native. No information regarding the size of the bony external auditory canal in native or Japanese skulls is readily available.

Yet it is certain that *Pseudomonas pyocyaneus* can be present in the external auditory canal without producing external otitis.

Sixteen attempts at culture were made from cases of *otitis media*, varying in duration from three days to years. The results were as follows:

Pseudomonas pyocyaneus	9 cases
Pseudomonas pyocyaneus and *Staphylococcus aureus*	1 case
Pseudomonas pyocyaneus and *Hæmolytic streptococci*	1 case
Staphylococcus aureus	2 cases
Coliform bacilli	1 case
Staphylococcus albus and *Staphylococcus aureus*	1 case
No growth	1 case

Of the 11 patients from whom *Pseudomonas pyocyaneus* was obtained on culture, three were suffering from *otitis externa*. Thus, in this small series, eight external auditory canals were bathed in pus containing *Pseudomonas pyocyaneus*, yet *otitis externa* did not develop.

The view has been put forward that infection of the skin of the canal results from local lowered resistance due to maceration and consequent partial devitalization. This view has something to support it. The external auditory canal is narrow and poorly ventilated, a factor which, by hindering evaporation, increases the moistness due to increased sweat gland activity. The deeper part of the canal is more poorly ventilated than the outer part, and remains moister, particularly in the recess just lateral to the tympanic membrane. Perhaps the greater width of the canal in natives, by allowing better ventilation and drainage, is the reason why the condition is not so prevalent among them.

Pseudomonas pyocyaneus is a widely distributed organism, and has ample opportunity to find its way into the external auditory canal. It can easily be introduced by fingers, or corners of towels, in attempts to dry the ear.

The frequency of both *Pseudomonas pyocyaneus* and coliform bacilli immediately suggests fecal contamination from some source. *Otitis externa* has commonly been attributed to swimming, and so many patients have stated that the attack came on within a couple of days after swimming that one is forced to consider this possibility. Major Alan Ferris repeatedly found *Pseudomonas pyocyaneus* in local river water. However, in this vicinity the disorder occurred as frequently after swimming in the sea as it did after swimming in the river—a practice which ceased suddenly after two crocodiles had been shot near the most popular bathing area. Many patients developed the condition who had not been swimming at all, and some even developed it on the ship on the way up. These facts indicate that swimming cannot be regarded as more than one precipitating factor.

Treatment.

The essential principles of treatment are the following.

1. To relieve pain. "A.P.C." every four hours or even every second hour, and a hot-water bottle, are usually sufficient; 15 grains of aspirin with two grains of phenobarbital will provide a night's sleep.

2. To remove all debris. The lesion will not heal until all desquamated epithelium and debris are removed. This is best done by means of an aural syringe. Water is used, as the mechanical effect of the syringing only is required. After the syringing, the ear is carefully dried, and any flakes of epithelium that separate easily are removed with a fine wool carrier. Frequently at the patient's first visit, the pain and swelling do not permit of much in the way of clearing of the canal. In this case, one proceeds with the next step.

3. To reduce the swelling. The most effective method I have found is to pack the canal, as firmly as is reasonable, with half-inch ribbon gauze soaked in 10% sulphanilamide ointment with 0·5% gentian violet; about three or three and a half inches are required. This dressing being greasy, can be inserted

into the deep part of the canal without causing an unreasonable amount of pain, provided care is used. It is left for forty-eight hours. It is then removed, and in the great majority of cases pain will have disappeared and swelling greatly decreased. (If appreciable swelling remains, the ear is repacked for a further forty-eight hours.)

The ear is again syringed, and it will be found that most of the desquamating epithelium is no longer adherent and can be removed easily, a healthy-looking canal wall being left; but there frequently remain, in the recess immediately lateral to the tympanic membrane, adherent flakes, which can be seen "peeping" out into the canal. I have found these most common in the upper anterior segment; Daggett found them mostly in the floor. In any case, they must be removed completely with the aid of a wool carrier, the end of which is bent slightly.

The ear is now dried carefully, and the whole of the canal wall is painted with a solution of 0·5% gentian violet in *Spiritus Vini Rectificatus* (70%). The ear is left for forty-eight hours, when it is again syringed and dried, and a small amount of sulphanilamide powder is insufflated.

On the fifth day, in the great majority of cases the lesion will be healed; but the ear must be inspected again in forty-eight hours, and if the powder can be seen to be still dry, no further treatment is necessary. If the powder is not visible, the ear should be syringed, dried, again painted with the solution of gentian violet in *Spiritus Vini Rectificatus*, and a little sulphanilamide powder insufflated.

It is hardly necessary to mention that the patient must be warned against allowing water into his ear during the treatment.

Under this treatment, relapse has been uncommon. It required a stay in hospital of eight days, the patient being discharged on the day following the final inspection. Most patients were admitted to hospital; but there is no reason why the patients less severely affected should not be treated as out-patients.

The gauze dressing was prepared as follows. The gentian violet was dissolved in the smallest amount of water possible, and taken up with anhydrous "Lanoline". The product was then mixed with sulphanilamide ointment (10%) and warmed to make a thick cream. It is essential not to heat this too much, as the sulphanilamide powder will be precipitated. Half-inch ribbon gauze was rolled through this mixture, and run between two spatulæ to remove the excess. Then the gauze was wound on a suitable core. Pieces of the necessary length were then able to be cut off. The dressing may have been just as effective without the sulphanilamide; but the sulphanilamide did no harm, and it left a healthy-looking, firm epithelium.

Sulphanilamide powder was used, as it was found that this did not become caked, as boric acid and iodine powder did, and so was more easily insufflated.

Astringents, such as silver nitrate (5%) or Burow's solution used in the manner described by Daggett, were found to be not so effective in this part of the world. Although *Pseudomonas pyocyaneus* was evident, acetic acid did not prove helpful in the treatment of the condition.

Summary.

1. The incidence of *otitis externa* in Australian troops in New Guinea is discussed.

2. The most prevalent type—desquamative *otitis externa*—is described.

3. It is considered that the condition is unlikely to be caused by a fungus. Bacteriological examination suggests that the condition is actually an infection of the skin of the canal with *Pseudomonas pyocyaneus* or coliform bacilli.

4. The rarity of the condition in natives is discussed.

5. Treatment is considered, the essentials being complete removal of desquamated epithelium, and reduction of swelling by packing.

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A COMMENTARY ON THE GUILLAIN-BARRÉ SYNDROME FROM THE GENERAL PRACTITIONER'S VIEWPOINT.

By RICHARD T. KENNEDY,
Gundagai, New South Wales.

FACED with a case of paralysis or paresis, the general practitioner is at once beset by bewildered kinsfolk of the patient in their anxious endeavour to extract a promising prognosis. It is manifestly impossible to advance more than a very reserved judgement in the early stages. Unless he has the complete confidence of the relatives by way of being their trusted family doctor, the practitioner will oft-times be tempted to transfer the patient to the care of a neurologist. The alternative is to be burdened with the intricate investigations necessary over a somewhat lengthy period, and at the same time ambushed, questioned, advised and doubted. The restive relative, however justifiable and understandable his attitude may be, becomes in this age of overwork and worry more of a problem than the patient himself. Be that as it may, the practitioner who comes upon a case of the Guillain-Barré syndrome and who will personally follow it through is assured of a profoundly interesting investigation, for here is a case of severe paresis or paralysis in which he can with almost complete certainty offer the relatives an extraordinarily good prognosis. In the words of Guillain,(1) "the recognition of the benignity of the prognosis is of real importance".

The Guillain-Barré syndrome of "radiculo-neuritis with acellular hyperalbuminosis of the cerebro-spinal fluid" is becoming more often recognized latterly, and in Australia the article and case reports by Susman and Maddox(1) have helped to make the practitioner alert to recognize patients presenting this syndrome. In the original report(2) to the *Société médicale des hôpitaux de Paris* on October 13, 1916, quoted by Guillain,(3) the following passage occurs:

> We call attention to a clinical syndrome which we have observed in two cases, a syndrome characterised by motor disturbances, loss of tendon jerks, with preservation of cutaneous reflexes, paresthesias with slight disturbance of objective sensibility, tenderness on pressure of the muscles, little change in the electrical reactions of the nerves or muscles and noteworthy hyperalbuminosis of the cerebrospinal fluid in the absence of cytologic reaction (albumino-cytologic dissociation).

That description fairly summarizes the main signs of the syndrome.

The disease is probably one of the most intriguing of the polyneuritides, in that, even after classification and separation, there remains much of mystery still to be explained.

What is its cause? Why the peculiar albumino-cytological dissociation—namely, normal cell count and hyperalbuminosis of the cerebro-spinal fluid? Why the extraordinary euphoria, "*la belle indifférence*"? There are innumerable questions and they all clamour for an answer. Until they are answered, the greatest query of all must remain an enigma, and that is: "Why the almost invariable total recovery of all power, no matter how widespread and overwhelming the paralysis?" In THE MEDICAL JOURNAL OF AUSTRALIA(3) it has been pointed out that it is unfair to call any type of polyneuritis, however closely it may resemble the original description by Guillain, "the Guillain-Barré syndrome", unless the case undoubtedly corresponds in detail. A perusal of recent literature has served to underline this point. Several cases are noted by different authors overseas, which, though adhering in some respects to the original criteria, vary yet in important detail.

Guillain(3) in an article published in 1936, makes the following statement:

> Our first communication established in cases of polyradiculo-neuritis of this type, first the albumino-cytological dissociation of the fluid and secondly the favourable prognosis. I have repeatedly insisted on the two characteristics of the syndrome.

Forster, Brown and Merritt(4) actually question the wisdom of offering a good prognosis in the Guillain-Barré syndrome and instance two fatal cases. In these two cases, however, the important albumino-cytological dissociation in the cerebro-spinal fluid was entirely absent.

Gillespie and Field(5) fail to state the percentage of protein in the cerebro-spinal fluid in their cases. There are many other

reports that fail to produce evidence that the cases should be classified as examples of the syndrome. It is simply amazing to find authors in other countries describing cases, which they label the Guillain-Barré syndrome, and from the descriptions of which they totally omit cerebro-spinal fluid findings.

The differential diagnosis between this syndrome and the initial stage of poliomyelitis depends to an enormous extent upon the pathological findings in the cerebro-spinal fluid. Dr. Eric Susman, in reference to this matter, aptly states: "I have seen much unnecessary suffering caused to relatives due to its (the syndrome's) superficial resemblance to poliomyelitis." Yet there should rarely be much difficulty in separating one disease from the other, even in the early stages, if one has the Guillain-Barré syndrome in mind, for the differences are great. A pyrexial onset is uncommon in the Guillain-Barré syndrome, and in fact, the whole course of the disease is apyrexial. An irregular and often unilateral muscle involvement is likely in acute anterior poliomyelitis; it is usually symmetrical in Guillain-Barré polyneuritis. Multiple cranial nerve involvement is rare in the latter disease also.

Despite the stress on the importance of the cerebro-spinal fluid findings, it should be noted that very often early lumbar puncture in cases of the Guillain-Barré syndrome produces fluid with a normal protein content. The case reported in this article is a typical instance of the necessity of carrying out a later lumbar puncture after an early one. From normal findings in the cerebro-spinal fluid (30 milligrammes of protein per 100 millilitres, and normal cell count) on the patient's admission to hospital, the reaction of the fluid changed so that seven days later a lumbar puncture produced fluid with a protein content of 110 milligrammes per 100 millilitres, the cell count still being normal. Had one not been tolerably certain from the start that the case was an instance of the syndrome in question, one might easily have decided otherwise on the findings and easily have neglected further lumbar punctures—which, by the way, are not pleasurable experiences for anyone, whether they necessitate general anæsthesia or not. The more so is this the case when the patient is a child.

While on the subject of the protein content of the cerebro-spinal fluid, I should like to quote a paragraph from THE MEDICAL JOURNAL OF AUSTRALIA.[3]

> Fox and O'Connor quote Guillain as having stated that unless the cerebro-spinal fluid protein exceeded 300 milligrammes per hundred cubic centimetres a case could not be regarded as belonging to this syndrome.

In this connexion, it might well be suggested that it is not always possible, surely, to stop the train dead upon the station. In other words, how can one know just when to perform a lumbar puncture that will produce fluid containing just above, rather than just below, the significant 300 milligrammes of protein per 100 cubic centimetres of cerebro-spinal fluid? The amount must unquestionably vary from day to day.

I have been unable to check the accuracy of the foregoing quotation, as it is difficult to obtain all the original sources. However, and in conflict with the quotation in question, in his article of 1936 Guillain[2] makes the following statement:

> Hyperalbuminosis is constant and pronounced; the albuminoids usually amount to from ·1 to ·2 Gm. per hundred cubic centimetres, sometimes more. Cases with slight hyperalbuminosis, with an albuminoid content of from ·03 to ·04 Gm., do not belong to the syndrome or must be regarded as instances of an abortive form.

The highest figures for the protein content of the fluid in the seven cases detailed by Susman and Maddox[1] in this country were respectively 150, 400, 150, 68, 250 and 40 milligrammes per 100 cubic centimetres of fluid. It seems, therefore, that hyperalbuminosis with a practically normal cell count is more diagnostic than any arbitrary figure.

Guillain has stated that the condition is rare in children; but the literature reveals a fair number of cases. Casamajer and Alpert[6] mention 19 cases of the syndrome in the French literature, instance another 19 in the English literature and add three themselves to the total. This was in 1941, and cases have been recorded since then. The age of twelve years has apparently been accepted as a basis. The case described in this article adds one more to the list of children.

The cause of the disease still remains a mystery, and its mode of attack is still somewhat in doubt. Guillain[2] himself makes the following statement:

> This syndrome seems to us to result from a concomitant attack on the spinal roots, nerves and muscles, probably by an infectious or toxic agent. It must be differentiated from simple radiculitis, pure polyneuritis and polymyositis. Graphic studies of the speed of the reflexes and their latent time and of the character of the muscular contractions demonstrate that the entire neuromuscular apparatus participates in the syndrome.

It is now generally considered that it is due to a virus infection, and, as in many virus infections, the patient is apyrexial throughout. The early investigations of Bradford, Bashford and Wilson,[7] whose names seem to have become almost indelibly connected with the literature on the disease, have supported this view. They, however, performed few spinal punctures, and their findings are not nearly so informative as they might be.

Shaskan[8] has done some recent work to elucidate the matter of a causative organism, and he makes the following statement:

> Spinal fluid was obtained from inoculation into mice and 14 successive passages were made from brain to brain. On the 15th day of the first passage the mice were jumpy; one was killed and passage made. On the 5th day thereafter, one of these mice appeared ataxic. He was killed and passage made. Some of these latter mice were found dead in two days; bacterial cultures of the brain were sterile. Subsequent passages with filtered or unfiltered material failed to yield any further evidence of infection. It was discontinued after the 14th passage.

The case set out in this article occurred at the height of an epidemic of infectious mononucleosis in this district; but although blood slides were examined by myself at intervals and a Paul and Bunnell precipitation test was carried out, no connexion between the epidemic and the case of radiculoneuritis in question could be discovered. Someone has stated that the manifestations of infectious mononucleosis are as diverse and as strange as syphilis, which mocks many diseases in its time. Further investigations in other cases might be of value.

The differential diagnosis and the key-points in diagnosis have been adequately set out by Susman and Maddox[1] in their article in THE MEDICAL JOURNAL OF AUSTRALIA, an article that might well be studied by every practitioner, as it is concise and embracing and makes for "the prepared mind".

As regards treatment, no specific therapy is known. Removal of septic foci, vitamin B_1 neurotherapy, infra-red irradiation and general measures to build up bodily resistance are indicated. Gillespie and Field[5] emphasize the fact that in a case they reported "improvement and recovery followed complete removal of numerous abscessed teeth". This, however, may reasonably have been the treatment that coincided with the certain improvement that Guillain has emphasized as being one of the outstanding features of the syndrome—that is, the favourable prognosis.

In the case described below the maxillary antra were both severely infected, but no treatment to eradicate the infection therein was attempted. Despite this fact the improvement was rapid, and the cure on the date at which this paper is being written, four months later, is complete as regards the polyneuritis and the paresis. The patient is as strong, as lively and as active as ever. His antral infection remains to be dealt with.

Guillain has this to say regarding treatment:

> Antiseptic remedies should be prescribed; they seem to me to have a favourable influence. I recommend particularly intravenous injections of sodium salicylate (from 1 to 2 Gm. daily in serum containing 10 percent dextrose), intravenous or intramuscular injections of quinine, methenamine or colloidal silver. I believe that arsenicals are contraindicated; arsenic has unquestionably a harmful action. It is well to combine with the antiseptic remedies electro-therapy in the form of ionization or iodine or calcium given by the trans-cerebromedullary path, with warm baths and irradiation.

The general practitioner who has the good fortune to deal with such a case will no doubt obtain equally good results with slightly less science. The humble practitioner is reminded of the judge's remark in the case of Adams *versus* Industrial Commission 1926.67 Utah 157:

> It appears that not less than thirteen doctors have in one way or another participated in this case. Notwithstanding this, it appears that the plaintiff is still alive, and in the opinion of one of the physicians, plaintiff's condition will improve, provided there is no further treatment.

Report of a Case.

N.G., a schoolboy, aged seven and a half years, was brought to my surgery by his mother on the evening of November 20, 1943. The mother stated that the boy "had gone in the legs and kept falling down". The previous day, when he was coming home for his midday meal, his legs gave under him three or four times, and each time he had to be helped onto his feet again by passers-by. When he reached home, his mother put him to bed. He did not seem in the least ill, had a good supper and slept well all night. He had a little pain around the ankles, but otherwise did not complain of anything save weakness in the legs that day. The next morning he attempted to go up the stairs, but found that his "legs would not work properly and he kept falling down the steps". He was put back to bed, but in the afternoon he got up and "hobbled down to the cinema", a distance of a quarter of a mile, sat the show out and "hobbled" back home again. After the evening meal his mother walked with him to my surgery, another quarter of a mile. This Marathon walking, or rather "hobbling", effort on the part of the lad with double foot-drop stands out as a striking monument to his unconcern. At consultation he was quite unworried by his crippling generalized weakness, and all that he admitted was "some pain behind the knees". He cheerfully stated that he was "much better already" when I had examined him, a statement in further keeping with the euphoria displayed by many patients in his condition.

Investigation of his past history in brief showed that he was breast fed to nine months of age; that he had never been rid of a cough since the age of six months; that he had had no other illnesses save the "bronchitis" that "gives him the cough"; that he had been immunized against diphtheria at the age of six and a half years; and that he had never had whooping cough. He was the youngest of four children, the eldest being aged eighteen years. The other children were all well. The mother had suffered from rheumatic fever when N. was weaned. The mother's father had died of miner's phthisis; her brother had suffered from pulmonary tuberculosis. The mother and her sister were radiologically examined and were reported to be free of any lung infection. The patient himself had always been very active, and was accustomed to "climb everywhere, and except for the chronic cough and attacks of bronchitis, which never confined him to bed, he had never until the present occasion caused any worry by illness".

On examination, the patient was seen to be an intelligent boy of normal build. He did not look ill, though he was patently tired after his quarter-mile "hobble". The word "hobble", suggested by his mother, is the only apt word to describe his crutchy walk due to his throwing his feet forward without lifting them. On standing and walking his knee joints were hyperextended, a position which, in association with marked lordosis, apparently compensated for his muscular weakness in the legs and permitted his remaining upright at all. Although it had not been noticed by the mother, he also had a double wrist-drop. His mouth temperature was 98° F. No cardiac abnormality was found; no albumin or sugar was found in the urine. Examination of the lungs revealed no signs of bronchitis. Neither maxillary antrum could be transilluminated.

No abnormality of speech was detected, but there was a distinct nasal whine in the voice. There was no over-emotionalism, no paresis or paralysis of the eye muscles, no fascial paresis and no nystagmus. The pupils were equal and reacted to light and convergence. No tremor was apparent, and no palatal palsy was evident. Acute tenderness was elicited when the left calf muscles were squeezed; the tenderness was less on the right side. No other muscles were found to be tender. Flexion and extension of the fingers were weak; the fingers were carried in a position of mild flexion, and active perfect extension was impossible. The fingers were held apart and complete active adduction was unobtainable; particularly was this noticed with the ring and small fingers. When an attempt was made to grasp an object the wrist was placed in the fullest possible extension first; flexion was then obtainable, but the grip, though the effort looked great, was pathetically weak. Flexion and extension at the wrist were both weak, and the wrists were carried in the typical "wrist-drop" position. The thumb and small fingers could not be made to meet within a quarter of an inch. When the boy lifted a thin book between the thumb and index fingers, the interphalangeal joint of the thumb had to be flexed. There was no evident weakness of biceps, triceps or thigh muscles. From the supine position he could sit up without using the leverage of his hands or elbows. Paresis of dorsiflexion of the ankle as well as of plantar flexion was noticed, but the former was the more severe, and only about 45% of normal dorsiflexion was voluntarily obtainable. Eversion of the foot was weak, inversion normal. There was no clinical anæsthesia and no incoordination save such as would be expected from the paresis. The tendon reflexes were striking owing to their "elusiveness". On one or two of many repeated atempts the ankle jerks were elicited weakly. The knee jerks were unobtainable save on one occasion, when they were elicited very faintly on the left side. The jaw jerk was absent, as were the triceps and wrist jerks. The plantar reflexes were flexor in type. The abdominal and cremasteric reflexes were brisk. The sense of passive position in relation to toe movement was good.

The boy was promptly admitted to hospital for investigation, the parents being given a hopeful prognosis. After his admission to hospital, his progress may be summarized as follows. On November 21 he was mentally quite bright, and afebrile. The ankle reflexes were absent, as also were the other tendon reflexes. The superficial reflexes were all brisk. Vitamin B_1 was given in doses of three milligrammes three times a day. Infra-red irradiation was commenced. Injections of two cubic centimetres of "Campolon" were given each day thereafter. On November 22 the patient's condition was unchanged, save for the eliciting of slight bilateral knee jerk. He was quite alert mentally. On November 28 no change in his condition had occurred, save that some momentary ocular muscle weakness was noted; a transient squint occurred for a "split second" every little while. This was so rapid as to be hard to assess; but it was thought to be due to paresis of the *recti laterales*. On December 1 no squint had been observable since November 28. The patient was sitting out in the sunshine. On December 3 he could walk, and could dorsiflex his ankles almost to a normal extent. The knee jerks, ankle jerks and triceps and wrist jerks had all returned in the preceding two days. The right hand grip was stronger than the left, but both were still weak. Transient weakness of the *rectus lateralis* muscle of the right eye was apparent again. On December 4 the sister reported that every night since his admission to hospital, and all night, the patient talked in his sleep. Dorsiflexion at the ankle and eversion of the feet were good. On December 15 the patient was allowed to return home; he had been walking around the hospital grounds. He still had slight foot-drop on both sides, but he could get about well. All the reflexes were now normal. He had remained afebrile throughout, and his pulse rate ranged from 70 to 90 per minute.

A number of investigations were made while the patient was in hospital. The results of examination of the cerebro-spinal fluid are shown in Table I. All specimens of cerebro-spinal fluid were clear in appearance. On November 21 Wassermann and Kahn flocculation tests for syphilis were applied to the cerebro-spinal fluid, with negative results. On December 14 no tubercle bacilli were found in the cerebro-spinal fluid, and no growth of any kind was obtained on attempted culture.

TABLE I.

Date.	Pressure.	Cells.	Protein. (Milligrammes per 100 Cubic Centimetres of Fluid.)	Colloidal Gold Curve Figures.
21/11/43	Increased.	0	30	1111100000–0
28/11/43	Increased.	0	110	0001220000–0
14/12/43	Increased.	0	80	1111110000–0

A throat swab was examined on November 29; no diphtheria bacilli were detected, but *Staphylococcus aureus*, pneumococci and *Micrococcus catarrhalis* were recovered on culture. On December 2 a nasal swab was examined; no diphtheria bacilli were detected, but *Staphylococcus aureus* and streptococci of viridans type were grown on culture.

A radiological examination on December 2 revealed that both antra were dull with infection; catarrhal changes only were seen in the lungs. The Paul and Bunnell test for infectious mononucleosis gave a negative result on December 10. On December 5 a tuberculin patch test with the Commonwealth Serum Laboratories' patch gave a negative result.

Summary.

The features of interest to the general practitioner who is confronted with a probable case of the Guillain-Barré syndrome are discussed.

A case of radiculo-neuritis of unknown causation in a child, associated with flaccid paralysis, albumino-cytological dissociation of the spinal-fluid, tendon areflexia and apyrexia, and with a good prognosis, is described, under the name of the Guillain-Barré syndrome.

Acknowledgements.

I am indebted to Miss M. Rolleston, of the library of the New South Wales Branch of the British Medical Association, for her unwearying patience in forwarding the requisite literature; sometimes a search of many other medical libraries in Australia was necessary.

The New South Wales Department of Public Health laboratories carried out the pathological investigations for me.

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Reports of Cases.

ACUTE LARYNGO-TRACHEO-BRONCHITIS TREATED BY PENICILLIN AND SULPHONAMIDES.

By ERIC B. SIMS, M.B., B.S.,
Medical Superintendent, Adelaide Children's Hospital.

"ACUTE LARYNGO-TRACHEO-BRONCHITIS" is a name applied to the clinical picture in childhood of a severe inflammation of the larynx, with its usual manifestations of stridor and chest retraction, associated with severe toxæmia, and a tendency for the inflammation to descend the respiratory tract. In its early stages tracheotomy is usually performed, and in anything up to 50% of the cases recorded in various series, death eventuates either from toxæmia, or more usually from the respiratory obstruction that results from this descent of the inflammatory process below the tracheotomy opening.

The earliest Australian references to this disease (which has apparently had more notice taken of it in the United States of America than elsewhere) were those of Mathew[1] and Beare;[2] but in recent years papers by Arden[3] and Arden and Duhig[4] have clearly defined the clinical picture and stressed the importance of the condition. The two first-named writers favoured the *Staphylococcus aureus* as the probable causative organism; but Arden, in his first paper, pointed out that the bacterial flora was by no means constant in the cases described by him, and suggested that "the only possible way out of this bacteriological tangle is to postulate a filter-passing virus as the infecting agent and to regard any bacteria found in the trachea as secondary invaders". In the later paper written by him in collaboration with Duhig, their further observations were considered by them to support this view. In this more recent series in Brisbane, the pathological investigations in two fatal cases failed to yield any evidence of inflammation in the larynx or trachea. Instead of inflammatory cell infiltration, necrosis of the mucosa of the upper portion of the respiratory tract was present; it was highly suggestive of a virus infection, but still no virus could be isolated.

In the first six months of this year, the Adelaide Children's Hospital experienced a minor epidemic of acute laryngitis or "croup". Sixty patients were admitted (compared with nine in the same period of 1943), and of these, seven were sufficiently severely affected to require tracheotomy. This arbitrary gauge of severity—the necessity for tracheotomy—is regarded by most writers as the dividing line between the diagnosis of ordinary "acute catarrhal laryngitis" and the diagnosis of "acute laryngo-tracheo-bronchitis". It is not unusual to find several cases of "croup" in the one family, only one of which may be severe enough to require operative relief. This was observed in two of our severe cases; and one of the children more mildly affected with croup, who was admitted to hospital during the same period, had just lost a small sister from a more severe inflammation that required tracheotomy in a private hospital.

In each of the seven cases now to be described, 20,000 units of diphtheria antiserum were administered as a routine measure, and throat and tracheotomy swabs were investigated for diphtheria organisms with uniformly negative results. Sedatives were given, a potassium bromide and chloral mixture being the usual choice, and the tracheotomy incision was always a low one, as near to the sternal notch as possible. All patients were treated in a steam tent after tracheotomy as well as before, and the mouth of the tube was kept moist by saline tampons.

Case I.

J.D., aged nine months, was admitted to hospital on February 3, 1944, at 7 a.m., with a history of an acute onset of respiratory difficulty four hours before. On examination, the baby was cyanosed; laryngeal stridor was present, and recession of the lower ribs and sternum occurred with each respiratory effort. The temperature was 104° F., and the pulse rate above 160 per minute. Tracheotomy was performed, and was followed by relief of the respiratory distress and the coughing-up of mucopus. Sulphathiazole therapy was commenced; but the pulse remained uncountable, and death occurred fourteen hours after the child's admission to hospital, apparently from toxæmia.

At the post-mortem examination of the respiratory tract, the lungs were found to be normal, but the region of the larynx was intensely congested; a number of scattered yellowish spots the size of pins' heads were present in the region of the aryepiglottic folds. There was a thick mucopurulent exudate in the larynx. Examination of sections revealed an intense inflammatory reaction, associated in many places with shedding of the epithelium. The submucosa was packed with polymorphonuclear leucocytes, which in places formed miliary abscesses. In the trachea the lesions bore more resemblance to those described by Arden and Duhig—almost all the epithelium was lost and the submucosa was somewhat hyaline and eosinophilic. Ordinary cultures of tracheal swabs in life revealed *Staphylococcus aureus* as the predominating organism. After death, filtered washings of the lesion were inoculated onto the chorio-allantoic membranes of eleven-day chick embryos. In two passages there were no signs of a virus, and intranasal and intracerebral inoculations of mice (four of each) also gave negative results.

Case II.

A.K., aged seven years, was admitted to hospital on February 19, 1944, with a history of a sore throat of five days' duration, and of difficulty in breathing for twenty-four hours before admission to hospital. On examination, his throat was inflamed, and a small patch of exudate was seen on the left tonsil; he had severe laryngeal stridor with chest recession. His temperature was 100° F. and his pulse rate 120 per minute. He was put in a steam tent, and treatment with sulphanilamide was begun; three tablets were given, followed by two tablets every four hours. Fourteen hours after his admission to hospital laryngeal obstruction became extreme, and tracheotomy afforded relief. The tracheal secretions were copious and viscid, but they remained sufficiently fluid to be sucked out, and no major incidents occurred in his subsequent care. He was still very ill after the tracheotomy was performed, and the sulphanilamide treatment was continued for five days, a total of 26·5 grammes being given. The tube was removed on the fourth day, and his subsequent convalescence was uneventful. Swabs from the tracheotomy tube and throat yielded a mixed flora, *Streptococcus viridans* being the predominating organism.

Case III.

R.T., aged nine months, was admitted to hospital on March 27, 1944, with a history of a "croupy" cough and of difficulty in breathing, of three days' duration. On examina-

[1] This reference will be found to present glaring mistakes in the figures supplied concerning the protein content of the cerebro-spinal fluid. The mistake is obviously one made in the translation from the French to the English text, but it is consistent in its repetition, and is due apparently to malposition of the decimal points.

tion, he was found to have a reddened throat, laryngeal stridor and chest recession. The temperature was 103° F. and his pulse rate was 140 per minute. He was put in a steam tent, and treatment with sulphanilamide was begun; three tablets were given at once, followed by one tablet every four hours. The drug was changed to sulphadiazine after eighteen hours. His condition remained stationary until twenty-six hours after his admission to hospital, when it deteriorated alarmingly; a great increase in the respiratory embarrassment occurred, his temperature rose to 104° F. and his pulse rate to 160 per minute. Tracheotomy was performed on March 28, and much mucopus was sucked out. His condition remained low the following day, the temperature being 105° F., the pulse uncountable, and the respirations 60 per minute in number. Frequent suction of thick secretion from the trachea was necessary. His condition slowly improved over the next two days. The sulphadiazine treatment was continued, one tablet being given every four hours, until a total of 19·5 grammes had been given. The tube was removed on the fifth day and his subsequent convalescence was uneventful.

Case IV.

P.A., aged three and a half years, was admitted to hospital on April 26, 1944, with a history of "croup" for three days, growing progressively worse. One older brother had also just had croup. On examination, the child presented the usual appearance, with a reddened throat, laryngeal stridor and chest recession. Her temperature was 100° F. and her pulse rate 140 per minute. She was placed in a steam tent and sulphathiazole treatment was continued, one tablet being given every four hours (she had already received 2·5 grammes in the twelve hours before her admission to hospital). Twelve hours later her breathing became more difficult, the chest retraction greater, and her colour deteriorated. Tracheotomy was performed, and much mucopus was coughed up, with relief. Suction through a soft rubber tube down the tracheotomy tube was carried out whenever the tube became obstructed, and it was always sufficient to remove the viscid secretions. The sulphathiazole treatment was continued until a total of 18 grammes had been given. Her condition steadily improved, and the tube was removed on May 2. Attempted culture from swabbings of the tracheotomy yielded no growth.

Case V.

B.F., aged three and a half years, was admitted to hospital at 9.30 p.m. on May 6, 1944, with a history of "noisy breathing" and paroxysms of coughing, becoming progressively worse for two days. On examination, she had laryngeal stridor and chest recession; her temperature was 99° F. and her pulse rate 160 per minute. She was put in a steam tent and sulphathiazole treatment was begun, four tablets being given at once, to be followed by two tablets every four hours; but her condition rapidly deteriorated, and tracheotomy was performed at midnight. Copious mucopus was present in the trachea. The next day she was profoundly toxæmic, her temperature was 101° F., her pulse rate was 160 per minute, and her respirations were irregular, averaging 70 per minute. Penicillin treatment was commenced at 3 p.m., 10,000 units (two cubic centimetres) being given intramuscularly every two hours. That evening her temperature was 102° F. and her pulse and respiration rates were unchanged. On May 8 she had improved remarkably in her general appearance. Her temperature had fallen to 99° F., but her pulse rate still averaged 140 per minute, and her respirations were still rapid. The sulphathiazole treatment had been continued for the first twenty-four hours after the commencement of penicillin therapy, but it was now stopped. On May 9 she seemed remarkably well; suction was required less frequently, and her temperature was normal. Her pulse rate and respirations averaged 120 and 40 per minute respectively. The penicillin treatment was continued at the same dosage until the full course of 500,000 units had been given, and it was discontinued at 5.30 p.m. on May 11. There had been a progressive improvement in her general condition during this time. The tracheotomy tube also was removed on that day. She was discharged from hospital on May 16. Throat and tracheotomy swabs at various times yielded on culture *Streptococcus viridans*, *Staphylococcus aureus*, *Staphylococcus albus* and *Bacillus subtilis*.

This girl's brother was also a patient in the hospital suffering from mild croup from May 9 to May 12, 1944.

Case VI.

C.T., aged one year and seven months, was admitted to hospital on May 5, 1944, with a history of difficult breathing, and of choking on attempting to cough, of thirty-six hours' duration. On examination, he presented the usual picture of an extremely toxæmic child, with stridor and chest recession. His temperature was 100° F. and his pulse rate 136 per minute. His colour was good. He was put in a steam tent, and treatment with sulphathiazole was begun, four tablets being given at once, followed by two tablets every four hours. His condition did not improve, and eighteen hours after admission to hospital his respiratory difficulty increased, his colour deteriorated, and tracheotomy was performed. This relieved his breathing; but the tube repeatedly became blocked, and after a further twenty-four hours, probing and suction with a gum-elastic catheter, followed by the substitution of a larger tracheotomy tube, were necessary. For the next three days his temperature ranged from 102·8° F. to 104·8° F., and his pulse rate from 160 to 180 per minute, and frequent suction was required. On May 10, at 10 a.m., the sulphathiazole treatment was stopped and the administration of penicillin was commenced. He was given 10,000 units (two cubic centimetres) intramuscularly every two hours. That night his temperature was 102·4° F. and his pulse rate 160 per minute. Frequent suction was still required. The next day his maximum temperature was 99·8° F., and his pulse rate by 10 p.m. had dropped to 120 per minute. He looked much better, his respirations were easier, and suction was employed effectively without obstruction. His condition was so greatly improved by May 12, 1944, that it was possible to remove the tube. His maximum temperature on that day was 99·2° F., but his pulse rate still averaged 120 per minute. The penicillin treatment was continued until 5 p.m. on May 14, when the fiftieth injection was given; this completed the full course of 500,000 units. He was afebrile from May 13 and very bright. No untoward effects from the injections were noted, and the child was discharged from hospital, well, on May 22.

Case VII.

P.P., aged three years, was admitted to hospital at 9 p.m. on May 20, 1944, with a history of a "cold" of two days' duration, and of difficulty in breathing for seven hours. On examination, she had a reddened throat, laryngeal stridor and pronounced chest retraction on breathing. Her temperature was 100° F., her pulse rate was above 160 per minute, and her respirations numbered 44 per minute. She was put in a steam tent, and sulphadiazine was prescribed, four tablets to be given at once, to be followed by one tablet every six hours; but her condition rapidly became worse, and tracheotomy was performed at midnight. The usual thick mucopus was found in the inflamed trachea. The next day (May 21) she was intensely toxæmic; her temperature was 103° F., her pulse rate was 160 per minute, her respirations numbered 50 per minute, and her tracheotomy tube frequently required clearing by suction. The sulphadiazine therapy was discontinued, and treatment with penicillin, 10,000 units (two cubic centimetres) intramuscularly every two hours, was commenced at 12 noon. Her temperature that night was 104·6° F., and her pulse rate above 160 per minute; but the next day (May 22), twenty-four hours after the commencement of penicillin treatment, her general condition was greatly improved, and by evening her temperature was normal. Suction now yielded much less secretion from the trachea. After forty-eight hours of the two-hourly administration of penicillin, the interval between injections was lengthened to three hours for a further thirty hours. Treatment was then stopped, a total of 360,000 units having been given. The child remained well, the tube was removed on May 26, and the patient was discharged from hospital on July 1.

The predominating organism in cultures of swabs from the tracheotomy tube on May 20 was *Streptococcus viridans*; on May 21 it had changed to *Staphylococcus aureus*.

Discussion.

All these cases were examples of an acute upper respiratory inflammation sufficiently severe to require tracheotomy, and as such they are to be classified as of "acute laryngo-tracheo-bronchitis". The response to therapy, however, was generally more favourable than is usually expected. Among the six patients who recovered, one responded to sulphanilamide, one to sulphadiazine, one to sulphathiazole and three to penicillin. In Case II, in which sulphanilamide effected a cure, a factor may have been the child's "husky" constitution, and his slightly greater age (seven years). In Cases II and III, it seems reasonable to assume that the results might have been very different without sulphadiazine and sulphathiazole respectively; and in the three penicillin cases, the response was sufficiently

dramatic to leave no doubt in various observers' minds that more than a coincidence was involved. The patients were probably the most seriously ill children of the series, and yet, after the penicillin treatment was commenced, they gave the least cause for worry. Each had improved greatly after 240,000 units, and although the administration of the drug was continued beyond this amount, it is probable that 300,000 units would have sufficed in each case. There appeared to be no tendency to relapse when treatment was stopped.

The microscopic examination of the trachea in the one fatal case in this small series revealed the necrotic changes described by Arden and Duhig; but in the laryngeal region intense inflammatory cell infiltration of the submucosa was found, which was apparently conspicuously absent in those workers' two autopsy cases. It is obviously unwise to dogmatize on such little material, and to suggest that this constitutes support for the contention that there is more than one pathological entity behind the clinical picture of "acute laryngo-tracheo-bronchitis". In any case, however, one is reluctant to regard these seven cases as clinical and pathological entities, to be classified separately from the other 53 children suffering from "croup" admitted to hospital over the same period. Indeed, the occurrence of these seven cases during an epidemic of non-diphtheritic "croup", with, in two instances, other cases of mild "croup" in the same families, suggested irresistibly to us that we were dealing with one disease that was varying in its severity rather than in its ætiology.

Case VIII.

That penicillin may prove of value whatever the cause in the individual case of severe infective laryngeal inflammation, is perhaps indicated by the following case of inflammatory œdema of the glottis. The patient was admitted to hospital during our epidemic. She had all the clinical manifestations of acute laryngeal obstruction and toxæmia, but with a few minor differences from the previous patients.

P. leL., aged five years, was admitted to hospital on May 16, 1944, at 6.15 p.m., with a history of a sore throat of one day's duration, and of difficulty in breathing for eight hours. On examination, she was seen to be severely toxæmic; her temperature was 101° F. and her pulse rate 140 per minute. She had an inspiratory stridor and definite chest recession. Her condition differed from that of the previous patients, however, in that she had a little snore with each expiration, and she also had a weak but moderately clear voice when she could be persuaded to speak. Also, digital examination revealed that the epiglottis was as swollen as a cherry, and a laryngoscopic examination later showed the entire glottis to be in the same state, the vocal cords being obscured by copious pus bubbling up from the trachea. An X-ray examination of the larynx and trachea (made soon after her admission to hospital primarily to exclude an opaque foreign body) revealed narrowing of the trachea, presumably due to swelling of the mucosa, down to the level of the sixth cervical vertebra. She was put in a steam tent and given sulphadiazine, six tablets at once, followed by two tablets every six hours, and her throat was sprayed with adrenaline (one in 100). She was no better next day, and tracheotomy seemed imminent; but in view of the X-ray evidence of the extent of the obstruction of the trachea, and in view also of the toxæmia, the sulphadiazine treatment was stopped and penicillin treatment was commenced at 2 p.m., twenty hours after her admission to hospital; 10,000 units were given every two hours intramuscularly. At that time her temperature was 101·2° F., her pulse rate was 160 per minute and her respirations numbered 52 per minute. The next day (May 18) her general appearance was greatly improved, her breathing was unobstructed and her maximum temperature was 99·4° F; but her pulse rate was still 160 per minute. The following day she appeared completely well, and her further convalescence was uneventful. The penicillin treatment was continued until May 20, a total of 400,000 units being given.

Culture of the pus obtained by laryngoscopy showed the predominating organism to be *Streptococcus viridans*.

Summary.

1. Seven severe cases of acute laryngo-tracheo-bronchitis in which tracheotomy was required, in a series of sixty cases of non-diphtheritic "croup" at the Adelaide Children's Hospital in the first six months of this year, are described.

2. The post-mortem findings in the one fatal case are described.

3. Penicillin administered intramuscularly after tracheotomy may alter the formerly grave prognosis of "acute laryngo-tracheo-bronchitis".

4. A case of inflammatory œdema of the glottis and trachea, in which penicillin treatment was also given, is described.

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LIPOSARCOMA OF THE MEDIASTINUM.

By E. A. JOSKE,
Balaklava, South Australia.

Clinical Record.

R.G., a male patient, on reaching the age of eighteen years, was found to have a left posterior mediastinal tumour at the routine examination of the chest made prior to entrance into the Royal Australian Air Force. In consultation, Sir Henry Newland confirmed the diagnosis, gave the clinical differential diagnosis, and advised removal of the tumour. The Casoni test produced a negative result.

On October 21, 1943, with the help of Dr. Boucaut, I made a paravertebral exposure, local anæsthesia with "Novocain" being used; the sixth, seventh and eighth ribs were removed from their respective vertebræ and also laterally for several inches. The tumour lay in the posterior portion of the mediastinum; it separated cleanly from the parietal pleura, being removed from its bed with a sucking sound. Laterally it had infiltrated the intercostal muscles. The nerves coursing ventrally were kept intact and the wound was sewn, and drainage of the cavity was provided. The patient has received a post-operative course of deep X-ray therapy. The tumour measured about four inches by three inches by two inches, and pathological examination of sections at the Institute of Medical and Veterinary Science showed it to be a liposarcoma associated with destruction of striped muscle.

Prior to the medical examination for entrance to the Royal Australian Air Force the patient considered himself healthy, though he admitted that horseback riding was prohibited by the pain it caused in his chest.

Comment.

Ewing, in his book "Neoplastic Diseases", states that: "Liposarcomas occur in all situations of lipomas, especially intermuscular, periarticular, perineal and mediastinal. They are encapsulated until recurrences develop as diffusely infiltrating highly malignant and metastasizing processes. The high mortality following surgical extirpation together with the high radiosensitivity of many of the tumours . . . seems to call for a conservative program involving diagnosis by aspiration, external radiation followed by interstitial radiation if required, and surgical resection of the residual tumour if demanded."

ERYTHROBLASTOSIS DUE TO ABO INCOMPATIBILITY.[1]

By G. A. KELSALL, M.B., Ch.B.,
Perth, Western Australia.

THAT erythroblastosis may occur in infants as a result of a reaction between the normally occurring isohæmagglutinins of the mother and the normal isohæmagglutinogens of the child, has recently been pointed out by workers in England.(1) It should be remembered that the Rh factor, though a common cause, is not the only cause of this

[1] The patient in this case was shown at a meeting of the Western Australian Branch of the British Medical Association on April 19, 1944.

disease, and that of 48 cases of erythroblastosis reported in one series,[3] 44 were due to the Rh factor, while of the remainder it is probable that A B O incompatibility was the cause.

The agglutinogens (A, B, O, Rh *et cetera*) are usually sufficiently developed at birth to be demonstrable, and may often be shown to be present during early fœtal life. The agglutinins, on the other hand, are usually absent at birth, or those agglutinins which are present have come through the placenta from the mother during intrauterine life. These gradually disappear by the end of about six weeks, after which time the infant develops its own appropriate agglutinins.[3]

If it so happens that the agglutinins acquired by the fœtus from its mother *in utero* are antagonistic to the fœtal agglutinogens, it is possible that there may occur a resultant destruction of fœtal red cells leading to erythroblastosis. Though the opportunity for such an incompatibility to occur must be present in many instances, the actual manifestation of the disease is only comparatively rare, or at least rarely recognized. It is probable that a proportion of the so-called cases of physiological jaundice will, in actual fact, be found to be of this nature. However, of those cases so far reported,[1] it is found in the small series that the mother's blood has always been of group O, while the blood of the fœtus was either of group A or of group B. We have so far encountered only two cases; in both of these the mother's blood was of group O, while the blood of one infant belonged to group A and that of the other to group B. The titre of the maternal agglutinins against the child's cells was 1:200 (anti-A) in one case and 1:256 (anti-B) in the other case.

Theoretically, one would expect to find cases of erythroblastosis in which the mother's blood was of group B and that of the fœtus of group A, or the mother's blood was of group A and that of the fœtus of group B, *et cetera*. Similarly, erythroblastosis due to the Rh factor is found only in a small proportion of potential cases. We have recently traced the Rh factor through four generations of one family. In only one instance out of five potential cases had erythroblastosis occurred. Why this should be so is as yet unknown.

The history of one of our cases of erythroblastosis due to A B O incompatibility is as follows.

Clinical Record.

Mrs. P., aged twenty-six years, gave birth to her first child in September, 1942. The child was stillborn, but we were unable to ascertain the cause of death, and there was no history of hydrops or jaundice. The patient had had no miscarriages. After an uneventful second pregnancy, on February 28, 1944, she gave birth to a full-term male child weighing six pounds fourteen ounces. The child became jaundiced within the first two or three days after delivery, but the jaundice soon faded, and she was able to take the baby home on the fourteenth day. We first saw the baby on March 21, when she returned the infant to hospital complaining that the jaundice had recurred and was replacing an extreme pallor in the child; but the child now weighed seven pounds four ounces. The infant had been breast fed since birth.

On examination, the child appeared to be a little under normal development, but did not seem undernourished. He had a mildly jaundiced appearance combined with a pallor which was most noticeable in the lips. He lay limply in his cot. The liver was normal in size and the spleen was not palpable. The Wassermann test failed to produce a reaction from the father and the mother as well as from the child. The child's temperature did not suggest an infection. Examination of the blood showed that the hæmoglobin value was 25% (Sahli) and that the erythrocytes numbered 2,040,000 per cubic millimetre; the blood film revealed the presence of pronounced polychromasia, anisocytosis and poikilocytosis, while normoblasts and other primitive red cells were abundant. A "shift to the left" was a feature of the neutrophile cells, most of which were biloped. The father's blood was of group A_1 and was Rh-positive; the mother's blood was of group O and Rh-positive, with an anti-A titre of 1:200 and anti-B titre of 1:80. Anti-Rh was not detected in the mother's serum. The baby's blood was of group A_1 and Rh-negative. As would be expected, the mother's unabsorbed serum strongly agglutinated the infant's cells, and fresh infant's serum incubated at 37° C. against its own cells produced a trace of agglutination microscopically, though this finding could not be obtained again later. Ten to fifteen cubic centimetres of blood were allowed per pound of body weight, and on March 24 the baby was given an intraperitoneal transfusion of 100 cubic centimetres of fresh, washed, group O Rh-negative cells suspended in saline solution. The next day his hæmoglobin value had risen to 36% and four days later to 53%, the erythrocytes numbering 3,500,000 per cubic millimetre. On April 3 his hæmoglobin value was 85% and the erythrocytes numbered 4,250,000 per cubic millimetre. Little polychromasia, anisocytosis or poikilocytosis was now present. The weight was now eight pounds three ounces. Further treatment consisted in the discontinuance of breast feeding, as it is probable[2][6] that the maternal agglutinins are secreted in the milk. The child was therefore fed artificially. The urine was kept alkaline by sodium citrate as required. Colloidal iron in doses of three minims three times a day and "Anahæmin", 0·5 cubic centimetre injected twice a week, were given to assist hæmopoiesis.[4] On May 15, 1944, the child was doing very well and appeared normal in every respect.

Commentary.

As the mother's blood formula was "O$a\beta$ Rh-positive" and the infant's blood was found to be "A (? anti-A) β Rh-negative" and anti-Rh was neither expected nor found in the maternal serum, it was assumed that the abnormal agglutinin was anti-A. "Normal" anti-Rh agglutinin was not, nor is it likely to have been, detected in the fœtal serum,[5] and had it been detected, it is unlikely that it would have agglutinated the child's own Rh-negative cells. Test sera against M, N and P agglutinogens were not available, though it would theoretically be possible for anti-M or anti-P or a "subgroup" anti-Rh agglutinin to have been the cause of the disorder.[7] The fact that the mother's anti-A serum had a titre of 1:200 confirmed the opinion that anti-A was the responsible agglutinin.

The problem then had to be faced of what cells should be transfused. The points to be considered were as follows. (*a*) If group A cells (or any of the subgroups of A) were given, the residual anti-A agglutinins[7] in the fœtal circulation would in time, or until they were absorbed, destroy both the infant's and the transfused cells, thus intensifying the disorder. (*b*) If group O whole blood were given, anti-A agglutinins would be added to continue the destruction of the infant's cells. (*c*) The transfused cells must be Rh-negative to avoid sensitization, as further transfusions were probable. (*d*) Fresh cells were needed, as the life of fresh cells is greater than that of old banked blood; they are therefore less liable to early hæmolysis after transfusion. Furthermore, it would be necessary to tide the baby over the period until his acquired anti-A agglutinin was eliminated and his own hæmopoietic system was able to cope with the situation. It was expected that the transfused cells would survive for approximately three months. Accordingly, fresh, washed, group O Rh-negative cells were given by transfusion. Group O cells were chosen for the reason that they were indestructible by any agglutinins likely to be encountered in the baby. Cross-matching at 38° F., 65° F. and 37° F. proved the suitability of the group O cells.

Another point of interest is the fact that the baby's blood was Rh-negative, whereas that of both parents was Rh-positive. Either the Rh agglutinogen was not yet sufficiently developed to be demonstrable, or the child's blood was genuinely Rh-negative. Two months later, when the baby's blood was retested it was still found to be entirely Rh-negative, showing that the transfusion had not masked the true Rh group. It would be possible in 25% of cases in which both parents were heterozygous Rh-positives and in which the two recessive *rh* genes united to form an offspring with Rh-negative blood.

The recession of the original jaundice followed by its reappearance after three weeks tends to lend clinical support to the evidence that not only are the agglutinins secreted in the milk, but also that they are assimilated by the infant and continue the destructive processes. The contention that the child should be weaned from its mother and fed artificially is thereby supported.

Summary.

1. The occurrence of *erythroblastosis fœtalis* due to normally occurring maternal isohæmagglutinins is discussed.

2. A case is quoted in which the maternal blood was "O Rh-positive", that of the father "A_1 Rh-positive" and that of the fœtus "A_1 Rh-negative". The titre of the maternal agglutinins three weeks after delivery was anti-A 1:200, anti-B 1:80. An agglutinin found in the infant's serum agglutinated his own cells. This was assumed to be anti-A agglutinin derived from the mother.

3. The treatment is described; it included a transfusion of fresh, washed Rh-negative cells of group O.

Acknowledgements.

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(5) A. S. Wiener: *Loco citato*, 1943, page 24.
(6) V. Krieger: "Importance of the Rh Factor in Obstetrics", THE MEDICAL JOURNAL OF AUSTRALIA, May 27, 1944, page 482.
(7) A. S. Wiener: "Distribution and Heredity of Variants of the Rh Type", *Science*, August 20, 1943, page 182; quoted by P. L. Mollison in *Bulletin of War Medicine*, February, 1944, page 343.

Reviews.

A YEAR BOOK OF UROLOGY.

"THE 1943 YEAR BOOK OF UROLOGY" is constructed on much the same plan as last year's volume.[1] The editor again is O. S. Lowsley. In making his abstracts of different articles (some of them are of considerable length) Lowsley tells the story of an author's work and adds his own comments—he does not use footnotes in the same way that editors of some of the other volumes use them. This makes for easier reading, though sometimes it is not quite clear what part is comment and what part is abstract. The book should be in the hands of all who have to treat patients suffering from urological conditions.

The opening section is entitled "General Considerations". Here are included such subjects as calculi; anuria, including that due to sulphonamides; infections; the male climacteric and tuberculosis. The discussion on the male climacteric is interesting, though many will question the long list of symptoms taken from a paper by A. A. Werner. In the section on the kidney and adrenal eleven subjects are listed. The subject of hypertension is discussed at some length and prominence is given to the views of Henline and Menning on principles for the management of hydronephrosis due to uretero-pelvic obstruction. In the section on the ureter the work of several surgeons on ureterostomy and uretero-intestinal anastomosis is described; some useful illustrations are presented. In the section on the bladder malignant disease receives a good deal of space. Skin metastases from bladder tumours are rare; a deposit on the upper lip is illustrated. In the section on the prostate the clinical importance of the glands surrounding the posterior portion of the urethra in the female is emphasized and the condition is described as the "female obstructing prostate"; the illustrations are effective. The last two sections deal with the genitalia and gonorrhœa.

In the production of this volume a careful choice of illustrations has been made; their reproduction is first rate and a credit to the publishers and printers.

A YEAR BOOK ON PHYSICAL THERAPY.

IN his introduction to "The 1943 Year Book of Physical Therapy", Richard Kovács, the editor, draws attention to the increased use of physical therapy occasioned by the war and states that we may "confidently expect that following the war, study, actual employment and further progress in physical medicine will be more extensive than ever before".[2] The editor also points out in a footnote to the abstract of an article by P. Bauwens on "Planning for Future of Physical Medicine", that a British Association of Physical Medicine has been formed, and that in the United States the Baruch Committee on Physical Medicine has been appointed to survey the field of physical medicine and to determine its possibilities. There is ample evidence then that more attention is being paid, and will still be paid, to this most important aspect of treatment. For this reason the publication of successive year books on the subject is to be welcomed.

In the first part of this work, devoted to physical therapy methods, thermotherapy, electrotherapy, light therapy, hydrotherapy and mechanotherapy are dealt with. These sections are followed by others on miscellaneous procedures, occupational therapy, institutional work and related subjects.

The second part of the book deals with applied physical therapy. The first section on physical therapy in war is most important because of the enormous scope that will be found in every country for measures coming under this heading in the rehabilitation of those injured and wounded on service. It is interesting to note that special work is being done at the Mayo Clinic in the training of service medical officers in physical therapy. A specimen programme of a six-hour course of post-graduate instruction in physical therapy is set out. The subject of rehabilitation "presents a task of a magnitude never existing before" and a special section is devoted to it. Sections are devoted to the application of physical therapy to conditions falling into specialist categories.

This book is primarily for the expert in physical therapy, but it has a message for many others. Every type of practitioner can, if he will, learn something from it.

PROGRESS IN INDUSTRIAL AND ORTHOPÆDIC SURGERY.

"THE 1943 YEAR BOOK OF INDUSTRIAL AND ORTHOPEDIC SURGERY" is a record of work done in this field during the year.[1] Charles F. Painter is the editor.

In a foreword to the first part, that dealing with orthopædic surgery, he refers to the fact that war provides an opportunity for the perfecting of orthopædic measures and makes a plea for tardiness in the adoption of a method until it has been properly tried and its value has been proved. In this first part sections deal in turn with fractures and traumatic dislocations; arthritis; tuberculosis; osteomyelitis; inflammatory conditions; tumours; congenital defects; lesions of the spine, legs and feet; and operative technique. The illustrations have been carefully chosen and well reproduced.

The second part of the book dealing with industrial medicine and surgery is much the smaller part, but it is full of useful information. In a foreword, Painter insists that an industrial physician, if he is to be of the most service, should be familiar with the set-up of manufacturing organizations. He states that medical schools are recognizing the necessity for inclusion in their curricula of courses in industrial medicine. A large section of this part of the book deals with problems of organization and the war. The type of subject dealt with may be shown by the following subjects selected at random: "Organization of Medical Services in Industry", "Important Factors in Industrial Preventive Medicine", "Wartime Problems in Industrial Health", "Effect of Wartime Conditions on the Health of the Factory Worker", "Industrial Hygiene in War Production", "Women in Industry: Present and Future Problems". Special sections deal with absenteeism, respiratory diseases and special hazards.

Altogether this is a worthwhile volume.

PROGRESS IN OBSTETRICS AND GYNÆCOLOGY.

"THE 1943 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY" has been edited this year, as it was last year, by J. P. Greenhill.[2] Greenhill is recognized as an authority on both subjects and is the author of several books dealing with them. This year book resembles the last in its general structure and its style is in keeping with that of other volumes in the

[1] "The 1943 Year Book of Urology", by Oswald S. Lowsley, M.D., F.A.C.S.; 1943. Chicago: The Year Book Publishers. 7" × 4¾", pp. 416, with illustrations. Price: $3.00.

[2] "The 1943 Year Book of Physical Therapy", edited by Richard Kovács, M.D.; 1943. Chicago: The Year Book Publishers, Incorporated. 7" × 4¾", pp. 414, with illustrations. Price: $3.00.

[1] "The 1943 Year Book of Industrial and Orthopedic Surgery", edited by Charles F. Painter, M.D.; 1943. Chicago: The Year Book publishers, Incorporated. 7" × 4", pp. 440, with many illustrations. Price: $3.00, post paid.

[2] "The 1943 Year Book of Obstetrics and Gynecology", edited by J. P. Greenhill, B.S., M.D., F.A.C.S.; 1943. Chicago: The Year Book Publishers, Incorporated. 7" × 4¾", pp. 584, with illustrations. Price: $3.00.

"Practical Medicine Series". Outstanding articles have been abstracted, and where it has seemed to him advisable the editor has added short comments to the abstracts. He may add something to an author's observations; he may advise perusal of the article in its original source; he may contrast an author's findings with those of others; he may express a preference of his own. These editorial footnotes add much to the interest of the book.

The volume is divided into two parts. The first deals with obstetrics. It is divided into several sections; in these are discussed pregnancy, labour, the puerperium, the newborn and miscellaneous conditions. A good deal of space has been given to the toxæmias of pregnancy. Reference is made to the classification recommended by the American Committee on Maternal Health in 1937. An article by Kellogg and Reid (Kellogg was a member of the committee) is abstracted and the editor thinks that the classification should be adopted for ten years, after which additional data might justify alterations. In the section on labour the use of vaginal antiseptics is mentioned, and reference is also made to the use of pituitary extract and other hormonal extracts. Of particular interest is a report of the vaginal delivery of a six months' living child four years after supravaginal hysterectomy had been performed on the mother. In this case the round ligaments and the infundibulo-pelvic ligaments were attached to the cervical stump and the conditions favourable to the establishment of a fistulous tract were fulfilled. Continuous caudal anæsthesia in labour is discussed at some length. The sulphonamides are considered in relation to the puerperium, and in the section on the newborn fœtal and neo-natal death receives the attention warranted by such an important subject.

The part of the book devoted to gynæcology is divided into ten sections. In the opening section dealing with general principles good advice is given on "intelligent" gynæcological examination—an examination confined to bimanual touch alone cannot be considered thorough or complete, inspection of the cervix and exploration of the uterine cavity being necessary before an accurate opinion can be given; further, no gynæcological examination can be considered complete without a study of the posture that the patient habitually assumes on standing. Functional disturbances in the sexual life of women are also discussed. This section is followed by others dealing with diagnosis, sterility, operative technique, benign tumours, malignant tumours and radiation therapy. Two valuable sections are devoted to endocrinology and to menstruation and its disorders. Endocrine therapy is destined to play an increasing part in gynæcology; the articles that have been chosen for inclusion in the book give a good idea of recent additions to knowledge of the subject. The abstracts on menstrual disorders will be found of interest by general practitioners. The concluding section deals with infections.

This volume is assured of a good reception by both specialist and general practitioner.

A YEAR BOOK ON DERMATOLOGY AND SYPHILIS.

"THE 1943 YEAR BOOK OF DERMATOLOGY AND SYPHILOLOGY" has made its welcome appearance.[1] It is one of the series of twelve volumes comprising the "Practical Medicine Series", so long known and valued by medical practitioners. This year the volume on dermatology and syphilis has been edited by M. B. Sulzberger. He was formerly the assistant editor and has succeeded Dr. Fred Wise, who edited the volume for eleven years; he has as his assistant Dr. R. L. Baer. In the preface Sulzberger pays a tribute to Dr. Wise's gifts as an editor—to his experience, keen judgement and unusual gift for clear, concise expression. The present volume maintains the traditions of those that have gone before it.

The editors note that, while the literature of the specialty during the past year bears the clear stamp of war and of wartime problems, the war has not dampened the scientific ardour of workers in the specialty nor retarded its steady progress. This is not to be wondered at when we remember that large numbers of men and women have left their usual home surroundings to join the fighting, nursing and other services, and have lived and worked under conditions and in climates to which they have not been used. They have been accompanied by medical services whose members have been able to observe and to investigate manifestations of disease in the skin as well as in other organs and systems. These observations are reflected in this and in other volumes of the "Practical Medicine Series".

The opening section of the book deals with skin tests and other immunological procedures in common dermatological and venereal diseases. This is described as a guide for the general practitioner. In the "general remarks" on this section it is emphasized that positive reaction to a skin test is never final proof of the causal role of a substance, and conversely, that lack of reaction to a skin test never completely exonerates a substance as a possible cause of clinical damage. An extensive table is given setting out clinical entities and skin tests which may be used in a search for eliciting agents. An attempt is made to assess the value of each test. The principal practical uses of the patch test are described. In a table are set out the characteristic sites of eczematous contact dermatitis and common causes of the condition. In another table covering many pages information is given on the concentrations and vehicles to be used in patch testing. The application of patch tests is described and certain "don'ts" in connexion with patch tests are stated. This chapter is described as Part I. The second part will be published in the 1944 Year Book and will deal with (*a*) further uses of the patch test, and (*b*) skin tests and practical immunological procedures. The sections of the book that follow deal with therapy (exclusive of venereal disease); X-ray and other physical therapy; eczematous dermatitis and urticaria, and allergy; drug eruptions; miscellaneous hæmatogenous dermatoses; other dermatoses; cancers, precanceroses and other tumours; *mycosis fungoides* and Hodgkin's disease; fungous infections; other infections (exclusive of venereal diseases); syphilis, other venereal diseases and their therapy. These are followed by an important section in which recent investigative studies are described; the final section is concerned with "miscellaneous" matters. Repeated reference is made to the use of sulphonamides in dermatology and to the hypersensitivity that may result. The section on syphilis is full of most important information; particular attention has been paid to intensive treatment and a number of articles on this subject have been abstracted.

This is a book that will prove valuable to any practitioner called upon to deal with dermatological conditions.

FRACTURES AND JOINT INJURIES.

WE welcome the second volume of the third edition of Watson-Jones's "Fractures and Joint Injuries" with all the praise, and more, that we gave to the first and second editions.[1] We stated it was a great book. It is still that, but greater. It has been enriched by the further experience of many wartime injuries, and there is a corresponding enrichment of illustrations, including some fine examples of colour photography. In reviews of the first two editions we added to our praise a little constructive fault-finding, and this time we permit ourselves a little more. First comes a stand for our English language. On page 636 we find the following illiteracy: "Radiographs in two places show whether the guide wire is penetrated to the correct depth; if it is not correctly penetrated the necessary length can be calculated." We do not think that this perversion of English usage should be allowed to pass in a book intended for educated men. The same perverted use of "penetrated" is repeated on page 651.

On page 656, in discussing pertrochanteric fracture, the author mentions as "on trial" the use of a three-flanged nail attached distally to a long plate screwed into the upper shaft of the femur, and concludes: "Meanwhile the routine treatment must be immobilization in wide abduction by a plaster spica, an abduction frame, or the 'well-leg traction apparatus'." His mention of open operation with plating and nailing is surprising, but it is evidence that something better is wanted than the "routine" treatment which seems to him to be the alternative. He appears to be unaware of the widely used Australian practice of abduction of both limbs, swung from an overhead frame, with traction on the injured side through a splint designed on the Hodgen principle, and developed from it. This combines comfort with high efficiency, and certainly no claim for comfort can be made for plaster, or for Jones's abduction frame,

[1] "The 1943 Year Book of Dermatology and Syphilology", edited by Marion B. Sulzberger, M.D., assisted by Rudolf L. Baer, M.D. Chicago: The Year Book Publishers, Incorporated. 7" × 4¾", pp. 584, with illustrations. Price: $3.00.

[1] "Fractures and Joint Injuries", by R. Watson-Jones, B.Sc., M.Ch.Orth., F.R.C.S. Volume II. Third Edition; 1943. Edinburgh: E. and S. Livingstone. 9¼" × 6¼", pp. 411-960, with many illustrations. Price: 75s. net per set. Postage 1s.

or for Anderson's "well-leg traction" apparatus. In reference to the "well-leg" system, Watson-Jones remarks on the same page that "traction alone may strain the knee-joint ligaments and cause an irritative joint reaction with adhesion formation".

On page 675 we discover the one and only occasion on which the Hodgen splint is mentioned, and we find a totally wrong description of it. It is referred to as a splint in which the weight is attached to the limb and not to the splint, which is exactly the reverse of its use. Dr. Hodgen, if he were now alive, would be very surprised to find this mis-statement in a serious book. Watson-Jones, in the same paragraph, describes how a Thomas splint can be suspended from an overhead beam and pulled on by a weight attached to the splint. That is, he converts the Thomas splint into a Hodgen, and uses the Hodgen principle, though he still calls it a "Thomas" splint. Why not give the credit to Hodgen, who, as a surgeon in the American Civil War, was the real inventor of the method? It is the opposite of the Thomas principle. It is clear that Watson-Jones has never made practical acquaintance with the Hodgen splint, nor has he studied Hodgen's methods. Justice ought to be done to Hodgen's memory. That justice has not been done.

In all parts of the book we find evidence of close study and a wide experience. But we are not told of any of the author's second-grade results, though we cannot believe that there have been none. After the various chapters are read the impression is left that few cases are simple enough for the country practitioner. We also get the impression that if any dissatisfied patient wants to bring an action claiming damages for an imperfect result, he will get ideal help from this book, which does not acknowledge failures or imperfect results, however serious and complicated the original injury.

Finally, we come back to praise. We would congratulate the author again on his chapter on rehabilitation. It is something to be read, marked, learned and inwardly digested by every man, specialist or otherwise, who has anything to do with injuries and injured persons, whether the injuries are physical or psychological, and whether the damage has seemed great or small.

OPHTHALMOLOGY.

THE fifth (and second wartime) edition of "A Handbook of Ophthalmology" by Humphrey Neame and F. A. Williamson-Noble is under review.[1] On perusal of its pages of admirable advice to students of ophthalmology, many thoughts cross the mind.

Firstly, we wonder whether it is either necessary or desirable to teach the undergraduate student such a wealth of ophthalmological detail and especially such diverse ophthalmological treatment. It would appear to be better to teach him the signs and symptoms of the major eye diseases and the ocular complications of general diseases and to omit such subjects as optics, refractions and orthoptics. If the student is to be taught the use of any ophthalmic instrument at all, it should be undoubtedly the ophthalmoscope and not the retinoscope.

The second thought concerns the large number of useless drugs exhibited in ophthalmology both locally and generally. Three-quarters of the local applications could be omitted with benefit to the patient, while many of the drugs used parenterally could be replaced by distilled water with equally efficacious results. Possibly the greatest benefit this war will bestow on ophthalmology is the elimination of costly and ineffective ocular treatment.

The third thought is the necessity of an up-to-date text-book of tropical ophthalmology for practising ophthalmologists. This war, with so many British and Dominion troops in tropical areas, such as the Middle East, Burma and the Pacific, has made the lack of such a book very apparent, and the immediate publication of one would be of the greatest value to this and the coming generation of oculists.

The fourth thought is the general lack of appreciation of the part which the virus of *herpes simplex* and also the acid-fast bacillus of Koch play in the pathology of the eye. Pure bacterial infections of the conjunctiva and cornea are now extremely rare, while recurrent virus infections are more common than usually realized. Similarly the crimes of infected teeth and tonsils have been greatly exaggerated in the past, while the multiplicity of the direct and indirect ocular lesions caused by the tubercle bacillus has been seriously under-estimated.

The last thought (and that arising out of the present war) has to do with the urgent necessity for the immediate placing of all patients with perforating wounds of the globe and with gonococcal ophthalmia on sulphapyridine or sulphathiazole therapy; this therapy should be continued until all risk of further infection has passed. The number of war-injured eyes saved by the early administration of these drugs is without question, while the rapid cures in *ophthalmia neonatorum* leave the aging oculist almost bewildered.

In conclusion, we must commend to all undergraduate students and to all general practitioners this work of Neame and Williamson-Noble, so sincerely written for their edification and help. At the same time, it is probably true that most general practitioners are now sufficiently wise to leave all but the simplest of eye maladies to those who devote their entire time and skill to the practice of ophthalmology.

[1] "A Handbook of Ophthalmology", by Humphrey Neame, F.R.C.S., and F. A. Williamson-Noble, F.R.C.S.; 1944; Fifth Edition. London: J. and A. Churchill Limited. 9¼" x 6", pp. 343, with illustrations. Price: 18s.

OTO-RHINO-LARYNGOLOGY AND THE CONSULTING ROOM.

As its title implies, "Office Treatment of the Nose, Throat and Ear" by A. R. Hollender deals only with those conditions the treatment of which is capable of being carried out at, and from, the consulting room, and practically no allusion whatever is made to any specific treatment requiring confinement to bed or admission to hospital.[1] The reason for the publication of the book, the author states in the preface, is that details of consulting room management are insufficiently stressed in the medical curriculum, in the training of resident medical officers in special hospitals and even in special text-books and monographs.

Although treatment only is dealt with, the pathology, symptomatology and differential diagnosis are touched upon whenever indicated. The author is obviously writing from a large experience, and for each condition a variety of forms of treatment available is fully reviewed and discussed in great detail and their respective advantages and disadvantages are enumerated. At the end of almost every chapter is a short evaluation of that chapter as well as a list of numerous references.

The book is divided into two sections. The first gives a general survey of available therapeutic measures, separate chapters being devoted to each of the following: immunization, endocrinology, nutritional management, pharmacotherapy, physical therapy, office surgery and radiotherapy. The second section is concerned with the various diseases of the ear, nose and throat, concluding with a chapter on nervous disorders. The discussions on the treatment of the diseases of the nasal sinuses are particularly good, and even better is the discourse on Ménière's symptom complex.

The author appears to be very devoted to vitamins, endocrinology and physiotherapy, and in connexion with the last-named it is obvious that the consulting room equipment of the average American oto-rhino-laryngologist allows of much more treatment on these lines than does that of his counterpart in Australia. It is apparent, too, that more surgical procedures are undertaken in the consulting room than is the custom here. Dr. Hollender is a strong advocate of radium irradiation after removal of nasal polypi and of application of radium to the naso-pharynx after recurrence of adenoids, and to the hypertrophied lymphoid tissue in the region of the orifice of the Eustachian tube in cases of deafness secondary to this cause.

Treatment, in the main, is thoroughly up to date, although a very occasional discarded procedure such as pneumo-massage of the drum is included. It is doubtful whether many would subscribe to the author's statement that for myringotomy (incision of drum) infants and children require no anæsthesia of any description, local or general.

There are numerous well-prepared illustrations, and the oto-rhino-laryngologist will find much sound and useful detail in the pages of this book. The quality of the paper is good and the work is well bound and durable.

[1] "Office Treatment of the Nose, Throat and Ear", by Abraham R. Hollender, M.Sc., M.D., F.A.C.S.; 1943. Chicago: The Year Book Publishers Incorporated. 8" x 5¼", pp. 480, with many illustrations. Price: $5.00, post paid.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 2, 1944.

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TOWARDS UNANIMITY.

EVERY member of the medical profession in Australia knows that during the last few years the Branches of the British Medical Association have been engaged in discussions directed towards the improvement of medical service for the community. Those who have followed the discussions in their own Branches and the reports of the doings of other Branches published from time to time in this journal, know that a good deal of progress has been made. They also know that more remains to be done. That progress has been slow is not to be wondered at, and for the sake of future decisions it may be well to recall the reasons for this slowness. The chief reason is to be found in the comparative isolation, owing to distance, of one Branch from another. Again the areas covered by some of the Branches are large and members of the Branch have not many opportunities for meeting. Before the outbreak of war members of the several Branches had opportunities of getting to know one another at the congresses that were held every three years. It is true that questions of medical politics found no place, and in virtue of the rules governing congresses could find no place, in official congress programmes, but an interchange of ideas took place among members of different branches and helped to lessen the disadvantages of distance. It is also recognized by those who travel round the several States of the Commonwealth that among their people subtle differences of outlook and temperament are to be found. Possibly these differences are due in part to climate and in part to the political set-up peculiar to the State. Be that as it may, differences have to be overcome if unanimity among medical men in widely separated areas is to be achieved. Unanimity is also hampered by reason of the fact that medical practitioners are essentially individualists. The kind of work that they do makes them so, and this characteristic is not easily put on one side. If progress towards unanimity in regard to the future of medical practice has been slow, it has, we venture to believe, been sure.

The organization of the medical profession in Australia, through the Branches of the British Medical Association, is democratic. The members of the Branches elect their Branch councils and the councils instruct the Branch representatives on the Federal Council in regard to the views of Branch members. The Federal Council, which meets at least twice a year, makes its decisions, but it has no power to bind the Branches, and its decisions are sent back to the Branches for ratification. In regard to some of the more important questions dealt with by the Federal Council, Branches do not all act in the same kind of way. One holds a convocation, another calls a convention of members, and yet another calls a full meeting of Branch members. Whatever method is chosen, the important point to be remembered is that members are given opportunities to become fully acquainted with all that is done and to express their opinions freely. The decisions of Branches and reports of meetings of the Federal Council are published in the pages of this journal. It should in passing be pointed out that, particularly in regard to Federal Council matters, all the reasons leading to a decision cannot always be published. Sometimes the Federal Council acts on information that is confidential or that should not for various reasons be made public. When members of the Branches criticize actions of the Federal Council, as being free citizens in a democratic setting they are entitled to do, they should remember that the council consists of their own representatives, elected by their own Branch councils, and that they are not likely to act without just reason. It would be foolish to say that mistakes are never made, but knowing the temper of Federal Council meetings and the desire of its members to act with wisdom, we think the council would be willing to admit errors in judgement that might occur. We have stated that reports of Federal Council meetings are published in this journal, and this raises a question which should be quite clear to members. Lest there be any misunderstanding, it must be stated that beyond any question the policy of this journal is the policy of the Federal Council, and the journal is the mouthpiece of the Branches represented collectively by the Federal Council. Just as the Federal Council is entitled to speak for the Branches, so this journal is qualified to express the views of the Federal Council and the Branches. From time to time members of the Branches criticize the Federal Council and Branch councils in the correspondence columns of this journal. This is a valuable right which every member should have and which we intend that he shall have—freedom to express opinions is one of the freedoms for which the war is being fought. The Federal Council is large-minded enough to stand up to criticism, though occasionally, it must be admitted, Branch members offer criticism which is not particularly well informed. At the present time, when it is so important that the profession should in matters medico-political speak with one voice, members would be well advised to consult with one or two of their level-headed friends before they put on paper views that are likely to produce discord where they would have harmony.

At the outset it was stated that much remains to be done in medical planning. Each Branch has its planning committee, and Branch members can bring their opinions

to their Branch officials. In open discussion constructive views should wherever possible take precedence over destructive opinions. Above all, it is necessary that an atmosphere of calm shall prevail. An issue must not be prejudged and motives must not be ascribed to opponents unless definite evidence for such motives is clear. It is fatally easy to write off an opponent as seeking ignoble ends just because he has a different opinion. Generally speaking it is safe to suspect the motives of one championing a cause when he insists that those of all his opponents are bad. This does not mean that opinions should not be strongly upheld; on the contrary they should be sustained with the greatest vigour, but the fight must be fair, if fight there has to be. The decisions of the medical profession that have yet to be made regarding the future need not be feared if a spirit of tolerance is generated and if none but worthy ends are sought. Every member of the profession should examine himself every now and again so that he will be sure in his own mind that his aims are worthy.

Current Comment.

THE ULTIMATE EFFECT OF PREGNANCY ON RHEUMATIC HEART DISEASE.

WHEN considering the risks of pregnancy in the subjects of rheumatic carditis it is usual to think only in terms of the immediate risks to the patient of gestation and labour. There are, however, numbers of women who successfully bear one or more children in spite of the handicap of rheumatic heart disease, and it is important to know if motherhood and all it entails has an adverse ultimate effect on the cardiac condition. In other words, if the existence of rheumatic heart disease does not prevent a woman from bearing and rearing children, is there reason to believe that her acceptance and performance of family responsibilities may make her more liable to succumb to congestive heart failure? This problem is tackled by N. H. Boyer and A. S. Nadas in a well-planned statistical study.[1]

These authors point out that other writers have not found any definite evidence that the handicapped heart is of necessity brought nearer to failure, provided the immediate hazards of child-bearing are safely passed, and their study sets out to answer the question without fallacy or error. The average age at death of patients with rheumatic heart disease is not of itself helpful information, for congestive failure may not be the cause of death, and adequate controls have not been used in such studies. As a basis for their research Boyer and Nadas have considered only the records of patients in the charity wards of three hospitals, so as to avoid the fallacy of comparing different social strata. The reproductive period was arbitrarily regarded as the ages between eighteen and forty years, so as to eliminate those women whose cardiac disability was severe enough to make child-bearing unlikely. It is significant that 37% of 49 nulliparous women in their series died between the ages of eighteen and twenty-nine. The histories of 103 parous women with rheumatic heart disease were studied, and the heart weights determined at autopsy in 27 of these compared with those of 16 in the nulliparous series. Further comparisons were made of the heart weights in women who had borne varying numbers of children, to see if their cardiac deterioration had been hastened by the added strain of larger families. Finally the average age at death from congestive heart failure in subjects with rheumatic heart disease was compared in different series of females and males, either with mitral affection only or with both mitral and aortic disease. The authors think that no statistical reason was disclosed why the male groups should not be used as controls. If we admit that such an inquiry needs close study in order to offset the fallacies which abound under conditions allowing so many variables, the authors' conclusions appear to be warranted. They consider that there is no significant difference in the average age at death of women with rheumatic heart disease who have borne children, whether one or several, and those who have not had a child. Further, they find that post-mortem data do not reveal that the burdens of maternity produce any appreciable increase in cardiac hypertrophy. They therefore think that the conclusion is justified that on the whole pregnancy causes no evil delayed effect on the course of rheumatic heart disease.

[1] *Annals of Internal Medicine*, January, 1944.

TOBACCO SMOKING AND POST-ANÆSTHETIC RESPIRATORY COMPLICATIONS.

READERS of Dickens will remember that formidable philanthropist, Mrs. Pardiggle, who boasted that her youngest child, Alfred, aged five, had voluntarily enrolled himself in the Infant Bonds of Joy, and was pledged never, through life, to use tobacco in any form. This was in 1853, when general anæsthesia was becoming established in surgical practice, and it is indeed possible that the backsliding Alfred, if he ever fell into the surgeons' hands in later life, may have suffered a painful post-anæsthetic cough in spite of early maternal care. Probably since the earliest days of inhalation anæsthesia it has been recognized that heavy addiction to tobacco and smooth anæsthesia do not lie easily together on the operating table. H. J. V. Morton thinks that the importance of the "*catarrhe des fumeurs*" is not sufficiently recognized by English anæsthetists, and now presents a study of the post-operative complications observed in 1,257 patients studied in hospital during a three-year period.[1] Referring to the considerable literature on the respiratory complications observed after operations performed under anæsthesia, he points out that it is agreed that the complication rate is higher after abdominal operations, and that many writers assert that the nature of the anæsthetic agent is relatively unimportant. However, few would disagree that local irritation in the respiratory tract may be a factor in favouring pulmonary affections after operation.

All Morton's cases conform to a surgical standard in one respect, for only abdominal operations are included in his series, and also to an anæsthetic standard, for the agent chosen was nitrous oxide and oxygen with minimal ether. Endotracheal catheters, whose use is thought by some to render respiratory morbidity more likely, were used only in a very few cases. Half the patients were anæsthetized by a closed circuit method, and all of them received premedication. The drugs used for this purpose were alternated, "Omnopon" 1/3 grain with 1/150 grain of scopolamine on one operating day and 1/75 grain of atropine the next. No significant difference was noted in the after-effects in these two groups, and the numbers of respiratory complications did not reach those published by other investigators who have studied the same problem with premedication followed by basal anæsthesia. The patients were grouped as smokers, light smokers and non-smokers. The first group included those who smoked ten cigarettes or half an ounce of tobacco a day. In abdominal operations of all types on males the total complication rate was 58% for smokers, 31% for light smokers and 7·5% for non-smokers. This complication rate is calculated from the proportion of patients who suffered from bronchitis, bronchopneumonia or atelectasis. The rates for females were much the same; the light smokers showed a rate of only 22%, but the total numbers were small. It is a little surprising to read that of about 600 women over twenty years of age, over 500 were non-smokers. But apart from this, the respiratory complication rate was found to be about three times higher in males than in females, which is in conformity with the usual figures. The reasons for

[1] *The Lancet*, March 18, 1944.

this are believed to be the greater dependence on diaphragmatic breathing by the male, the greater exposure to adverse weather conditions occasioned by the work of many men, and the greater numbers of herniotomies included in all such series of operations on men, since this type of operation is known to be associated with a relatively high proportion of pulmonary after-effects. But, leaving the interesting question of sex incidence on one side, Morton's figures show that the morbidity rate after all types of abdominal operation is about six times higher in smokers than in non-smokers, and further, that these pulmonary complications are apt to be more severe.

MEDICAL INSPECTION OF SCHOOLS IN VICTORIA.

THE report of the Minister of Public Instruction of the State of Victoria for the year 1942-1943 has been published and bears the date 1944. This report is full of information for all who are interested in education. There is a report on primary education; there is another on technical education, and yet another on art and applied art. The last section in the report is that on medical inspection and is presented by Dr. Eileen Fitzgerald, the chief medical inspector.

From the Minister's report we learn that the estimated net enrolment of pupils for the year was 215,709, excluding those at senior technical schools, who numbered 24,304. The total cost of "instruction" (primary, intermediate, secondary, technical and university education) was £2,922,823 16s. 4d. Of this amount, £25,704 19s. 4d. was spent in school inspection. The cost of education was thus £12 4s. per child. This amount, of course, includes many overhead charges such as maintenance of schools and so on. The cost of medical inspection was approximately two shillings per child, a small amount when the advantages of medical inspection are considered, an amount so small also that no objection should be raised on the ground of expense when a move is made after the war to secure an extension of the work.

The staff of the medical inspection department is full time and consists of seven medical officers, nine dentists, ten dental attendants (there temporary), twelve school nurses (eleven temporary) and two disinfectors (one temporary). During the year the medical officers examined 53,261 children and 1,462 teachers; the school dentists treated 24,912 children and the nurses visited 6,963 homes, paying 7,734 separate visits. Dr. Fitzgerald states that an increasing number of children found to have defects are receiving treatment. She explains that the mental health of many children has been ruined by their maladjustment in school and by the tendency to grade children according to their chronological, rather than their mental, age. "A more reasonable attitude" is being gradually adopted in this regard. A child psychiatric clinic was established by the State Evacuation Committee, and this committee has worked in close cooperation with the school medical services. It has been found that inability to compete in ordinary classes owing to mental, physical or social handicaps is largely responsible for emotional maladjustment leading to permanent distortion of mental and social health. "The cases examined to date provide convincing evidence that the roots of much adult nervous illness, mental disorder, social incompetency, and delinquency are to be found in the lack of proper provision for the educational adjustment of handicapped children in the school system." It is to be noted that a special school for mentally defective children has been established at North Footscray. This school is described as fresh and bright and as having advantages over two other such schools which are in "drab decaying buildings". This may possibly be remedied after the war—at any rate it is to be hoped that it will. Dr. Fitzgerald is right when she states that every large school should have at least one "opportunity grade" for handicapped children. In 1941 provision was made for the establishment of a "special class" for partially sighted children. The attendance is now eighteen, and the ages of the pupils range from seven to fifteen years. Some years ago attention was drawn in these pages to the excellent school for partially sighted children that is conducted by the Department of Education in Tasmania, and the view was expressed that Tasmania's lead should be followed in other States. The special class in Victoria can be looked on merely as the beginning of proper provision for partially sighted children in that State.

At the end of her interesting report Dr. Fitzgerald comments on the type of male applicants who are seeking admission to the service. A male teacher should be a man "who by his own personality will become a model on which the children's ideals will develop".

BILATERAL OOPHORECTOMY IN MALIGNANT DISEASE OF THE BREAST.

As long ago as 1905 Hugh Lett presented before the Royal Medical and Chirurgical Society in Great Britain an analysis of ninety-nine cases of inoperable carcinoma of the breast in which oophorectomy had been carried out.[1] He remarked that although removal of the ovaries for carcinoma of the breast had fallen into disfavour and was but seldom practised, it was worthy of further trial because of the local and general improvement in the patient's condition that might accompany it. This was in the days when surgeons know nothing about hormones. It is therefore interesting to note that views of much the same kind have recently been expressed. J. S. Horsley has reported on his use of bilateral oophorectomy in twenty-five cases of breast cancer.[2] The critic will be tempted at once to say that if there had been anything in the treatment it would not have been dropped. This may be true, but after all it is well to keep an open mind. The recent reports on the results following castration in cancer of the prostate, showing at least a temporary improvement in the state of the patient, are an incentive to the adoption of such an attitude.

Horsley states that his experience with the ultimate results of radical operation for cancer of the breast has been disappointing. Of nine patients under 36 years of age subjected to radical mastectomy between September 1, 1922, and November 1, 1937, five have had recurrences. Among all the patients operated on during this period there was one death due to operation and 75 subsequently had recurrences. When Horsley first began to perform bilateral oophorectomy as part of the operative treatment for breast cancer, he confined the operation to patients under forty years of age; later he extended the operation to all patients in the premenopausal stage. His present attitude is that he will not treat a patient for breast cancer unless she is willing to undergo oophorectomy. Since November 1, 1937, and up to October 1, 1943, he has performed bilateral oophorectomy and radical mastectomy on twenty-five patients. Fourteen of the patients have been operated on since January 1, 1942, and the last operation took place on September 22, 1943. So far two patients have had recurrences. One of these patients is supposed to have had internal metastases at the time of operation and the other had a mucoid cancer. Clearly the time that has elapsed since these patients were operated on is too short for any conclusions to be drawn and 25 patients are also too few. All that can be said is that Horsley has again drawn attention to this subject, and that, as Lett stated years ago when oophorecomy was used empirically, the procedure is worthy of further consideration, but in the light of our knowledge of hormones. It has been shown experimentally, for example, that œstrogens when injected into mice will cause cancer of the breast, and Parsons and McCall, writing in *Surgery* in 1941, reported the case of a woman whose adenocarcinoma of the breast was thought to be induced by strenuous œstrogen therapy. It is also known that when the source of one hormone is removed from the body the other sources of hormone try to adjust the balance. To deprive a woman of her ovaries, however, is a serious procedure never to be adopted without just reason. This subject is one for careful laboratory and clinical research.

[1] *The Lancet*, January 28, 1905, page 227.
[2] *Surgery*, April, 1944.

Abstracts from Medical Literature.

GYNÆCOLOGY.

The Occurrence and Significance of Clostridium Welchii in the Female Genital Tract.

R. SALM (*The Journal of Obstetrics and Gynæcology of the British Empire*, April, 1944) reports the results of an investigation on the occurrence of *Clostridium welchii* in the upper portion of the vagina of puerperal women and its relation to symptoms manifested during the puerperium. The high vaginal swabbings were examined by direct smear and by aerobic and anaerobic methods of culture. In only three of the fifty positive cases were the bacilli found in the direct film. The anaerobic cultures were found to be more satisfactory in the cooked meat broth than in the milk. The author examined 843 vaginal swabs taken during the puerperium from patients showing a rise of temperature above normal. *Clostridium welchii* was found in fifty cases or 6%. Two control series, however, of 600 high vaginal swabs from the ante-natal and venereal diseases clinic showed an incidence of *Clostridium welchii* of 6·33% and 7·67%. In the puerperal cases *Clostridium welchii* was found most frequently associated with *Bacterium coli* and anaerobic streptococci. Group A hæmolytic streptococci were found with *Clostridium welchii* in only one case. It is possible that the origin of both the *Clostridium welchii* and the *Bacterium coli* is the bowel of the patient herself. Other suggested sources of contamination are sanitary pads, cotton wool and gynæcological rubber bags. In this series the length of labour appeared to have very little influence on the occurrence of *Clostridium welchii*. However, 40% of the positive cultures came from patients who had had manual or instrumental interference during delivery. The author states that the isolation of gas bacilli from a high vaginal swab is not sufficient to cause a patient to be regarded as infected with *Clostridium welchii*. In the absence of signs and symptoms, such a report should put the clinician on his guard, but active treatment should not be instituted without clinical evidence of invasion.

War Amenorrhœa.

F. E. WHITACRE AND B. BARRERA, with the assistance of T. N. BRIONES, P. S. SUACO AND A. DE LA PAZ (*The Journal of the American Medical Association*, February 12, 1944) present a clinical and laboratory study of war amenorrhœa. In January, 1942, the authors arrived at an internment camp at Manila, Philippine Islands, and noticed the high incidence of amenorrhœa. In the middle of June 1,172 women were interned in the camp, all but 26 being American or British; 1,042 were aged between fourteen and forty-five years. By April 125 patients were found who had amenorrhœa which had developed since the outbreak of war; many patients complained of irregular menstrual periods, but only a few suffered from menorrhagia. In many instances the menses returned after several months' absence. Another group consisted of sixty interned army nurses who had been through the campaigns of Bataan or Corregidor; fourteen had amenorrhœa, seven dysmenorrhœa, five menorrhagia and four irregular menstrual periods. In many instances the menses stopped abruptly after the first bombing of Manila or soon after internment and before a food deficiency could have had any effect; the authors considered that the cause might be of an endocrine nature, and in spite of disabilities they attempted an investigation. Two representative patients of the 125 were selected. The full twenty-four hour urine output except for the first morning specimen was collected and extracted for œstrogenic substance every second day from June 23 to July 21, 1942, the time of a complete cycle. The single morning specimens were kept separate and extracted for anterior pituitary-like gonadotropic substance. The test rats reacted to priming doses of a known œstrogen; but all the vaginal smears from the same rats injected with the extracts of urine from both patients gave completely negative results. A further test with the urine of the first patient after the return of her menses resulted in at least 6·6 rat units in twenty-four hours. Quantitative findings as to the amount of gonadotropin in the urine were not satisfactory, owing to the small number of rats available, but it was at least present. If it had been present in excessive amounts, it would be assumed that permanent ovarian damage had occurred; this would have a poor prognosis for the patient. The authors conclude that although nutritional factors may have resulted in amenorrhœa developing later, they had little to do with the sudden onset of this widespread condition. The war amenorrhœa was probably due to severe psychic shock, worry and fear, which, acting through the autonomic nervous system, caused a complete suppression of ovarian function. Reassurance of the patient is part of the treatment. Active treatment should be by the administration of œstrogenic substance, rather than of gonadotropic material. As œstrogenic substance was not available, vitamin *E* in the form of wheat-germ oil was used. The authors believe that psychic factors were probably operative.

The Relationship of Congenital Syphilis to Abortion and Miscarriage.

A. LOUIS DIFFEL (*The American Journal of Obstetrics and Gynecology*, March, 1944) compares a series of fœtuses from non-syphilitic mothers with a similar number from luetic mothers. Only those which had not reached viability were included in the study. The criterion of diagnosis in the fœtus was the finding of spirochætes in fœtal organs, the liver and lungs being the most fruitful sources. Any mother who gave a positive blood reaction to the Wassermann test or whose serum ceased to react following therapy, was considered syphilitic. The placenta was not routinely examined for spirochætes on account of previous reports that it might be necessary to examine several hundred sections before any of the typical organisms were found. Twice as many macerated fœtuses were found in the syphilitic series as in the non-luetic. A diagnosis of fœtal syphilis was made in 23·8% of the fœtuses of all the luetic mothers who aborted or miscarried. Of the mothers who did not react to the Wassermann test and who gave a history of treated syphilis, 22·2% of the fœtuses were found to be syphilitic. This confirms the fact that a negative result given by the Wassermann test after antiluetic therapy is no indication that congenital syphilis will not occur in a subsequent pregnancy. This series agrees with others in showing that fœtal syphilis is never diagnosed before the sixteenth week of gestation. The proportion of fœtuses in which spirochætes were demonstrated rises as the gestational time increases. The figures indicate that abortions before the sixteenth week are rarely, if ever, the direct result of fœtal syphilis; that syphilis is occasionally responsible for the interruption of pregnancy between the sixteenth and twenty-third weeks and may frequently be responsible for such an outcome between the twenty-third and twenty-eighth weeks. However, it seems clear that the Wassermann-positive mother must be given some arsenic therapy before the eighteenth week of gestation if syphilitic infection of her fœtus is to be avoided. Furthermore, some treatment must be given before the twenty-third week of pregnancy irrespective of whether the mother does or does not react to the Wassermann test. The early fœtal protection from the invasion of the maternal spirochætes is suggested to be due to the action of the Langhans cells which are present as a layer up to the sixteenth week of pregnancy. This theory is supported by the fact that a lower incidence of spirochætal infection of the fœtus was found in association with placentæ in which some persistence of the Langhans cells was seen after the sixteenth week.

The Contractions of the Pregnant Uterus under Spinal Anæsthesia and the Attendant Changes in the Reactivity of the Myometrium.

PERCY MALPAS (*The Journal of Obstetrics and Gynæcology of the British Empire*, April, 1944) has studied a series of patients undergoing abdominal operations during pregnancy. In all cases spinal anæsthesia was used and the effect of this on the uterine contractions was observed. Two easily demonstrable effects of spinal anæsthesia on the pregnant uterus are that it releases contractions and heightens the reactivity of the myometrium to various stimuli. In virtue of these effects, it provides a method by which the pattern of uterine contractions and the factors which maintain uterine quiescence during pregnancy may be studied. If it is assumed that spinal anæsthesia paralyses the entire motor innervation of the uterus and if its effect on the human pregnant uterus is the release of contractions, the obvious conclusion is that the normal action of the central nervous system is inhibitory, and such action is a sustained one. The pattern of the contractions varies with the stage of pregnancy. Up to the twentieth week they appear as travelling waves following a defined path which can be correlated to the Müllerian architecture of the uterus. They start in symmetrical areas near the Fallopian tubes and appear to spread along the paths where the muscle fibres are more condensed. The contractions of late pregnancy are mass contractions affecting all parts of

the upper segment equally. The change in the type of contractions is mainly due to an alteration of the mechanical conditions of the muscle fibres and in part to a diminution in the relative importance of nervous inhibition. The reactivity of the myometrium to mechanical stimulation is heightened by spinal anæsthesia. This increased reactivity is most marked in early pregnancy and along the path of the travelling waves. It is suggested that nervous inhibition is one of the ways in which an early pregnancy is protected from casual traumata, which might otherwise set up spreading contractions and bring on abortion. The author suggests that nervous inhibition has at least as important an effect as progestin in preventing abortion in early pregnancy. Further developments in the treatment of cases of spontaneous threatened abortion may come from an increase in the knowledge and use of the sympathomimetic drugs in supplementing nervous inhibition.

OBSTETRICS.

The Effect of Pregnancy and Puerperium on the Thiamin Status of Women.

H. S. LOCHART, S. KIRKWOOD AND R. S. HARRIS (*American Journal of Obstetrics and Gynecology*, September, 1943) have conducted a research to obtain an exact measurement of the effect of pregnancy and early puerperium on the thiamin status of women. Thiamin was administered orally and intramuscularly to determine the excretion peaks of sixteen women. It was found that approximately three times as much thiamin was needed in titrating the excretion peaks of these subjects during late pregnancy and early puerperium. It is suggested that the requirements of thiamin during pregnancy and lactation are three times those in the non-pregnant state.

Studies on the Rh Factor.

H. A. SCHWARTZ AND P. LEVINE (*The American Journal of Obstetrics and Gynecology*, December, 1943) have made some further studies of the Rh factor by reporting a series of tests on 99 mothers. The cases included unexplained stillbirths or neo-natal deaths and some cases of the various complications of pregnancy. It was found that in cases in which the fœtuses were macerated serological examination for Rh factor and anti-Rh agglutinins in the mother's blood often elucidated the cause of the fœtal death. With this method of diagnosis, *erythroblastosis fœtalis* was found to account for somewhere between 16·6% and 29·1% of macerated fœtuses. A study of a small number of patients with eclampsia and preeclampsia was made to determine whether the conditions were associated with isoimmunization factors. In six out of seven such cases the mother's blood was "Rh+". In spite of this the authors do not think this theory of the ætiology of toxæmia should be discarded without further investigation. The possibility of isoimmunization by blood factors other than the Rh factor should be borne in mind. With regard to early abortions the Rh factor seemed to have no significance before the second trimester of pregnancy. Likewise in tubal pregnancies, hydatidiform mole, congenital abnormalities such as hydrocephalus, hare lip and hæmolytic anæmia, the Rh factor appears to be of no importance. Although the number of such cases studied was not large, the mothers' blood was found to be Rh-positive in every case. While infants with *erythroblastosis fœtalis* are often premature at birth, most causes of prematurity appear unrelated to the Rh factor. While these studies were limited to the Rh factor as detected by human anti-Rh serum, the authors suggest that future work should be based on finer differences of the Rh factor and should take into account the fact that other blood factors, such as A, B, H_2, and possibly many others, may also induce isoimmunization of the mother with resulting damage to the fœtus.

Œstrogens and Post-Partum Breast Engorgement.

B. E. MEEK AND W. H. MURBY (*The Canadian Medical Association Journal*, March, 1944) present the results of a study of the use of œstrogens to prevent post-partum breast engorgement. Their clinical material consisted of thirty patients, in whom for various reasons it was desirable to inhibit lactation. The authors conclude that natural œstrogen, given by the oral route in a dosage of three tablets (3·75 milligrammes) every four hours for five doses, is effective in preventing breast engorgement during the post-partum inhibition of lactation. They have found that 1·25 milligrammes of natural œstrogen appear to be at least the equivalent of 1·0 milligramme of diethylstilbœstrol, when inhibition of breast engorgement is used as a criterion of œstrogenic effectiveness. Both natural œstrogen and diethylstilbœstrol proved efficient, and both preparations were well tolerated. Œstrogens or testosterone did not prove helpful if given two or more months after delivery; they were most effective when given in the early post-partum period. With regard to testosterone, the authors state that they have found it to have no advantage over œstrogens, and they believe that it is more advisable to use an œstrogen for female patients.

Continuous Caudal Analgesia in Obstetrics.

W. R. HODGES (*The Journal of the American Medical Association*, June 3, 1944) has used continuous caudal analgesia in 300 obstetric cases; he carried out both the anæsthetic and the obstetric procedures, and he had had no previous experience with caudal anæsthesia. In all but three cases, after the induction period the patients were watched by a trained nurse, the physician being "on call". The necessary subsequent doses of the anæsthetic agent were given by the nurse. No accidents or complications due to the physician's absence occurred. The author stresses the fact that if the physician cannot be constantly present, all the patients should be attended by one nurse specially trained in the method. He used the method of Hingson and Edwards; a 1·5% solution of "Metycaine" in saline solution (or preferably an isotonic solution of three chlorides) was employed. He emphasizes the need for care in the selection of patients, especially early in the physician's experience of the method. In the author's series the optimum duration of caudal analgesia was seven hours or less; the method failed to maintain complete relief in those cases in which analgesia was required for a longer period, though he is unable to give the reason. Otherwise all patients obtained complete relief if the caudal needle was so placed that the anæsthetic solution had free and continued access to the peridural space. The average duration of analgesia for *primiparæ* was six hours and twenty minutes, and for *multiparæ* it was three hours and fifteen minutes. The possible complications of the method are dural puncture, intravenous injection and infection. The author has found that obstetric management is facilitated by the method; the second stage is lengthened, unless it is terminated by instrumental delivery in the majority of *primiparæ*; the third stage is usually shortened and the blood loss is diminished. One maternal death followed inversion of the uterus. The infants were unaffected. Failures were almost all due to faulty technique or to the use of the method too early in labour. Unpleasant side effects included nausea; there were no important sequelæ.

Terminal Caudal Anæsthesia in Obstetrics.

R. S. CRON AND J. A. KLIEGER (*The Journal of the American Medical Association*, June 3, 1944) review 800 obstetric cases in which terminal caudal anæsthesia was used. They state that in 88·8% completely successful anæsthesia was obtained, and in 11·2% anæsthesia partly or totally failed. In 600 cases the average duration of anæsthesia was eighty-nine minutes. Immediate anæsthetic complications were few and transient. In no case did any untoward events attributable directly or indirectly to the anæsthetic method occur. No effects on the infants were noted. The authors find that the possibilities of penetration of the dura, massive spinal anæsthesia or broken needles are slight; with the precautions they have taken, these accidents have not occurred in their series. They noted no indications for specific medication directed against possible toxic effects of the anæsthetic agent used. No infections of the sacral area occurred. Preliminary skin infiltration was not used; it was considered unnecessary and a potential factor in infection. The authors conclude that terminal caudal anæsthesia is of real value in obstetrics. Its use should be restricted to those who will take time to learn the method completely; such care will be rewarded by the occurrence of a minimum of failures and complications. Proper instruction will also put an end to the unjust criticisms of the method sometimes made; they spring rather from the operator's lack of skill than from any inherent fault in the procedure. The drug used was "Metycaine"; it was preferred because it had greater efficacy, rapidity and dependability of action and a somewhat less degree of toxicity than others of a similar nature. The average dose was 40 cubic centimetres of a 2% solution. A complete account of the technique is given.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal Prince Alfred Hospital on May 18, 1944. The meeting took the form of a series of clinical demonstrations by members of the honorary medical staff of the hospital.

Skin Disorders.

DR. C. F. ROBINSON showed several patients suffering from skin disorders. The first, a female patient, aged twenty-eight years, had been admitted to hospital suffering from jaundice of gradual onset. Whilst she was in hospital she developed a macular rash on her body and a papular rash on the palms and soles. The Wassermann test produced a positive reaction. No specific treatment had been given before she entered hospital. A diagnosis of secondary syphilis and catarrhal jaundice was made. "Mapharsen", 0·02 gramme, was given, and a mild Herzheimer reaction resulted. Then bismuth, only two cubic centimetres twice a week, was given. After the lapse of two weeks, 0·03 gramme of "Mapharsen" was given and tolerated. Dr. Robinson said that the patient had been given 0·04 gramme of "Mapharsen" twice a week; since then, the jaundice and the rash had disappeared, and she felt better.

Dr. Robinson's second patient was a woman, aged fifty years; whilst her husband was on leave she "did a round" of the picture shows and hamburger shops. Twenty-one days later a sore developed on her upper lip. The Wassermann test produced a positive reaction with the patient's serum, but no reaction with her husband's serum. An indurated sore with ulceration in the centre was present on one of her hands. A diagnosis of primary syphilis was made. Treatment consisted of twenty daily injections of 0·06 gramme of "Mapharsen" and 2·0 cubic centimetres of bismuth solution twice a week in hospital. It was proposed to give twenty more injections of 0·06 gramme of "Mapharsen", injections being given twice a week, and then to keep the patient under observation for one year, bismuth injections being given once a week.

Dr. Robinson next showed a female patient, aged sixty years, who gave a history of hard, deeply situated nodules on the skin of the face and chest. Some had disappeared without treatment. On examination, such nodules were found on the ear, chest and face; the skin over them was bluish-red in colour. Some of the nodules were 7·0 centimetres in diameter, others 3·0 or 4·0 centimetres. A provisional diagnosis of sarcoid of Darier-Roussy was made. Later a pathological examination of a section did not bear out the provisional diagnosis; it was thought that the tumours were malignant, of a sarcomatous nature. Dr. Robinson said that investigation was proceeding.

Dr. Robinson's fourth patient was a male, aged fifty years, who had complained of the sudden development of red papules, 0·5 centimetre in diameter, capped by hard yellow tips; they were especially pronounced on sites of pressure and in the sacral regions. The papules were found to be composed of histiocytes and fibrous tissue. The condition was diagnosed as *xanthoma diabeticorum* due to a metabolic imbalance and increase in the blood lipoids. A sugar tolerance curve was almost normal, but the patient gave a history of a trace of sugar in the urine occasionally. The blood cholesterol level was increased. Dr. Robinson said that his condition had improved with a low cholesterol diet, and if improvement ceased, insulin was to be tried.

The next patient shown by Dr. Robinson was aged sixty years, and was suffering from psoriasis. Brilliantly erythematous, sharply circumscribed, non-indurated, infiltrated and scarcely elevated flat papules were present; they had been scaly from the onset, and were a few millimetres in diameter. The treatment proposed was the application of crude coal tar and "Vaseline" and ultra-violet irradiation.

Dr. Robinson finally showed a male patient, aged sixty years, suffering from *mycosis fungoides*. The lesion was in three stages: (i) the prefungoid stage, erythematous itchy plaques being present; (ii) the infiltrative stage, the plaques being elevated and bluish-red in colour; (iii) the tumour or fungoid stage, in which the tumours were necrotic—the so-called "rotten tomato" tumours. Treatment had been by fractional doses of X rays, and chaulmoogra oil, applied for fifteen minutes twice a day. Dr. Robinson said that the prognosis was bad; up to the present nothing permanently arrested the disease.

Perforated Gastric Ulcer.

DR. B. DENNING showed a male patient, aged eighty-six years, suffering from a ruptured peptic ulcer. Dr. Denning said that the patient was shown because apparently he was the oldest recorded patient suffering from that condition. Recently in an extensive survey in England of several thousand cases of ruptured ulcers, the oldest recorded patient was aged seventy-nine years; one was also reported from South Australia, aged eighty-two years.

The present patient had been admitted to hospital on January 12, 1944. He gave a history of vomiting and abdominal pain, of three hours' duration. Three hours previously severe generalized pain had developed in the abdomen, and then he had vomited some offensive material; he had vomited about three times since then without relief of the pain. The pain was so severe that it caused him to "double up" in agony. His appetite had been poor for two or three days previously, but otherwise he had noticed no change in his condition.

On examination, the patient was sitting propped up in bed, in obvious pain; his face was thin and emaciated, his respirations were rapid and shallow, and he obviously suffered pain if he took a deep breath. His breath was offensive; his abdomen did not move at all on respiration, and the skin covering the abdomen was loose, wrinkled and dehydrated; palpation caused severe pain, and generalized rigidity was present all over the abdomen. The pulse rate was slow (76 per minute), the volume was poor and the pulse was difficult to feel. The blood pressure was too low to be ascertainable.

The patient's general condition was so poor that any immediate surgical procedure was out of the question. One-sixth of a grain of morphine was given, and saline solution was given intravenously in an attempt to restore his general condition to a state fit for operation. Twelve hours later Dr. Denning was asked to examine him; at that time, although the abdominal signs were still the same, the patient's general condition had improved and operation was decided on. Anæsthesia was induced by a small dose of "Pentothal" given intravenously. As soon as his rigid abdominal muscles relaxed under the anæsthetic agent, a large pulsating mass was felt in the mid-line in the region of his umbilicus. An incision was made near this, and the mass proved to be a large aneurysm of his abdominal aorta, but not the cause of his symptoms. His abdomen contained large quantities of turbid fluid, and a perforation was present at the pylorus. The perforation was over-sewn, the peritoneal cavity was sucked free of fluid and the abdomen was closed. For the first few days the patient was restless and delirious and was found out of bed on several occasions; but after that his convalescence was uneventful, and in three weeks he was considered fit for discharge from hospital. He was able to resume playing bowls three months after his operation.

Aneurysm of the Abdominal Aorta.

Dr. Denning's second patient was a man, aged sixty-eight years, who had a large swelling in his abdomen, from which he had no symptoms. On examination, the swelling was found to measure about eight inches in length by four inches in width; it was in the left side of the abdomen and appeared to be generally pulsatile, expansion being uniform in all directions. X-ray examination showed the swelling to be pushing the stomach and intestines to one side, and also to be not related to the kidneys. The Wassermann test produced no reaction, and the condition was considered to be an aneurysm of the abdominal aorta.

Staphylococcal Septicæmia with Extradural Abscess of the Cord, Treated with Penicillin.

DR. R. A. MONEY showed a male patient, aged thirty-three years, who some five weeks earlier had had a large and acute carbuncle on the upper portion of his right arm. About a month after its onset, he suddenly suffered from a severe pain in his right lumbar region when reaching up above his head to take a book from a shelf. This pain was thought to be due to a "rick" in his back, but it was not relieved by the usual remedies for this condition. Three days later it spread around both sides of the upper part of his abdomen and became even more severe. Shortly afterwards, abdominal distension and retention of urine were noted, followed by weakness and loss of sensation in the legs. Despite enemata, his bowels could not be made to open, and frequent catheterization was required to withdraw his urine. This state of affairs gradually progressed and caused much discomfort and distress.

On examination, on March 5, 1944, the patient was of dusky colour and orthopnœa was obvious. His temperature was 102·4° F., his pulse rate was 130 beats per minute and his respirations numbered 40 per minute. The abdomen was much distended and the reflexes were absent. There was a band of hyperæsthesia across both sides of the body just above the level of the umbilicus. Patchy anæsthesia was noted in both lower limbs, together with much loss of power, especially in the quadriceps muscles. The tendon reflexes were exaggerated and the plantar responses were doubtful. On examination of his back, signs of pneumonia were detected on both sides. The spines of the eighth, ninth and tenth thoracic vertebræ were tender to percussion. Some blood was taken immediately for cultural examination, and a leucocyte count showed that the cells numbered 13,500 per cubic millimetre of blood. Spinal puncture was performed at the fourth lumbar intervertebral space; yellowish-green turbid cerebro-spinal fluid was obtained at a pressure of 300 millimetres. No rise of pressure occurred when the Queckenstedt test was performed, so that a block somewhere along the spinal canal was obviously present. Some fluid was withdrawn; it coagulated completely within ten minutes, and 95 neutrophile leucocytes were counted in each cubic millimetre.

Dr. Money said that the history and findings pointed to a diagnosis of extradural abscess of the cord, causing compression myelitis in the vicinity of the eighth, ninth and tenth thoracic vertebræ. Accordingly, under anæsthesia produced by "Pentothal" given intravenously, laminectomy was performed at this situation. Some pus was encountered in the muscles of the sacro-spinalis group on the right side, and a large extradural abscess was found anterior to the laminæ of the affected vertebræ, causing pachymeningitis and compression of the cord. The pus and granulations were evacuated until pulsations appeared in the cord. The wound was filled with a mixture of sulphathiazole and sulphanilamide powder and packed with "Vaseline" gauze. *Staphylococcus aureus hæmolyticus* was grown in culture from the pus. The administration of sulphathiazole by mouth was commenced, four grammes being given *statim*, followed by two grammes every four hours. During the next few days his condition improved somewhat, although culture showed that *Staphylococcus aureus* was present in his blood, and the total number of leucocytes increased to 37,000 per cubic millimetre. Pustules appeared in the skin around his wound, and there was a copious seropurulent discharge.

On the seventh day after operation his temperature was again 102·4° F. and his mental condition was confused. Administration of penicillin was then commenced, by the continuous intravenous drip method; 200,000 units were given during the ensuing twenty-four hours, and thereafter 100,000 units during each subsequent twenty-four hours until 600,000 units had been given. By this time considerable improvement had occurred in the patient's condition, and his temperature was falling by lysis. During the next five days, 400,000 units of penicillin were given intramuscularly at intervals of four hours. Thereafter convalescence was slow but satisfactory. The wound healed by secondary intention at a satisfactory rate, but an area of unresolved pneumonia at the base of the right lung persisted for about ten weeks. It thus appeared that the penicillin was capable of rapidly dealing with the systemic and wound infection, but not capable of causing rapid resolution of the pneumonia.

Jacksonian Epilepsy Associated with Brain Scar and Traction Diverticulum of the Ventricle.

Dr. Money next showed a male patient, aged eighteen years, who had sustained a compound, comminuted, depressed fracture of the skull at the age of five years, after falling a distance of about twenty feet from a balcony. He was admitted to the Royal Alexandra Hospital for Children, where an immediate operation was performed to control hæmorrhage and replace some of the indriven bone fragments and remove some others. His immediate convalescence was satisfactory, and he remained quite well until the age of twelve years, when he commenced to have convulsive seizures. Encephalography and other investigations carried out at the Royal Alexandra Hospital for Children revealed no abnormality. When he was about fifteen years old, he was having convulsive seizures on an average of two per month, although later a change of environment and the exhibition of sedatives gave him a period of freedom for about eighteen months. During the last quarter of 1943 he joined the Royal Australian Air Force, but "toughening up" drill soon produced a recurrence of his seizures, and prior to his admission to hospital he was having as many as three in one week. The seizures were always preceded by an aura of "a peculiar feeling" in the left side of the face, which spread to the left arm and leg, and it was observed that the clonic movements began and proceeded in the same areas.

When the patient was examined, an irregular area of raised bone with an irregular gap in its centre could be seen and felt in the right postero-parietal region. Examination of his visual fields revealed an irregular quadrantic defect in the lower nasal field of the right eye. Otherwise, examination of his nervous system revealed no abnormality. X-ray examination revealed the site of the fracture in the right parietal bone; portions of the bone were displaced and bone was missing from some areas. Encephalography then revealed a large diverticulum from the body of the right lateral ventricle, extending out to the site of the fracture and separated from it by only a few millimetres of brain tissue, probably scar tissue.

Operation was then performed. The fragments of replaced and displaced bone were removed; the cerebral scar, which was bound up with the remains of the dura, was excised down to the ependyma of the lateral ventricle, which was isolated but not opened. A piece of aponeurosis of the external oblique muscle of the abdomen was used to replace the missing dura, and the gap in the bone was filled in with a graft from the inner table of the ilium. Dr. Money said that convalescence had been uneventful, and since operation some four weeks earlier, no further seizures had occurred. Adequate sedatives were still being administered, and it was hoped that these could later be reduced in amount.

Hypertension Treated by Splanchnicectomy.

Dr. Money's next patient was a male, aged twenty-nine years, who had complained of "tightness" in his chest and breathlessness on exertion, of two years' duration. He also suffered from headache, attacks of giddiness and palpitation of the heart. His father had died at the age of fifty-three years from hypertension. When the patient was aged eighteen years, he had had a severe attack of tonsillitis which had kept him confined to his bed for three weeks.

When the patient was examined, a forcible apex beat could be seen and felt three and a half inches from the mid-line in the sixth intercostal space. The systolic blood pressure was 250 millimetres of mercury and the diastolic pressure was 150 millimetres of mercury. His urine was clear. He was kept at complete rest in bed for some days and his blood pressure was taken once during the day and once during the night. The average readings were 320 millimetres of mercury, systolic, and 140 millimetres of mercury, diastolic. An electrocardiogram showed evidence of myocardial degeneration. A basal dose of "Avertin" was given *per rectum*, and while he was under the influence of this anæsthetic agent his blood pressure fell to 120 millimetres of mercury, systolic, and 85 millimetres of mercury, diastolic. This indicated that his hypertension was largely the result of spasm.

The operation of splanchnicectomy was then performed on his left side, after the method of Peet. A small portion of the eleventh rib was removed, and then the three splanchnic nerves, with the twelfth thoracic sympathetic ganglion, were excised as they lay against the body of the twelfth thoracic vertebra. Convalescence was uneventful.

Dr. Money said that since the operation the patient's symptoms had disappeared, and he felt well. The systolic blood pressure had averaged 190 millimetres of mercury and the diastolic pressure 130 millimetres of mercury. The readings would be repeated at intervals of one week for the next three months, and should any further rise take place, a similar operation would be performed on the right side.

Hæmorrhagic Cyst of the Brain.

Dr. Money finally showed a male patient, aged forty-one years, who had had attacks of Jacksonian epileptic fits for about one year. They were confined to the right side of the body, and were preceded by an aura of numbness in the right foot. At other times he felt "cramps" in the right leg, which would shake and twitch. Later these attacks spread up to involve the right arm. Recently he had noticed loss of power in the right foot and leg and weakness in the right arm. Frontal headaches had also commenced.

On examination, loss of voluntary movements in the right foot and ankle, with weakness in the power of the right thigh and right arm, was noted. Loss of sensation to touch and pinprick had occurred in the right foot. In the right lower extremity the tendon reflexes were exaggerated, and both ankle and patella clonus was present. The plantar reflex on the right side was extensor in type. Examination of the ocular fundi revealed early papillœdema on both sides, more pronounced on the left side than on the right. Lumbar

puncture showed the pressure of the cerebro-spinal fluid to be 230 millimetres. No cells were present in the fluid, and the protein content was 20 milligrammes *per centum*. X-ray examination of the skull revealed an area of increased density in the left parietal bone.

A preliminary diagnosis of left parasaggital meningioma was made, and a left parietal bone flap was raised. A large cyst containing xanthochromic fluid was located immediately posterior to the Rolandic area for the arm at a depth from the surface of about 1·5 centimetres. This cystic cavity was opened and much disintegrated blood clot and brownish fluid was evacuated. No tumour nodule could be seen, although it was thought that one must be present, and that the hæmorrhage had occurred from a tumour. A tube was placed down to the bottom of the cystic cavity, and as after the release of the contents of the cyst all signs of raised intracranial pressure had disappeared, the dura was closed and the bone flap was replaced.

Two days later, during the removal of the tube, some fresh hæmorrhage occurred, and the patient was unable to move his right upper extremity at all and became aphasic. After this a series of lumbar punctures was performed, and more brownish fluid and blood clot was removed from the cyst. After these procedures the aphasia disappeared and power returned in the right upper extremity. Dr. Money said that the intracranial pressure had remained high, and the papill-œdema in the left eye was now obvious and increasing. It was thus thought that the patient had a hæmorrhagic tumour deep in his left cerebral hemisphere, but that owing to its proximity to the left motor cortex and Broca's area, further attempts to remove it were contraindicated. It was proposed to give the patient a course of deep X-ray therapy.

(To be continued.)

NOTICE.

THE General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioner has been released from full-time duty with His Majesty's Forces and has resumed civil practice as from the date mentioned:

Dr. William Wood, "Locarno", 141, Macquarie Street, Sydney (July 21, 1944).

Medico-Legal.

HOCKING VERSUS BELL.

THE Full Court of New South Wales on August 3, 1944, set aside a verdict given by a jury in favour of Mrs. Stella Hocking, of Quirindi, New South Wales, against Dr. George Bell, of Sydney. By a majority the court entered a verdict for Dr. Bell with costs of all trials and appeals. The judgements of Mr. Justice Davidson, Mr. Justice Halse Rogers and Mr. Justice Roper, who comprised the Full Court, are published herewith in full.

His Honour Mr. Justice Davidson's Judgement.

In this litigation which has had an unfortunate history a further stage has been reached. A charge of negligence was made against the defendant, a prominent surgeon, that he negligently left a piece of drainage tube in the wound in the plaintiff's neck after an operation for thyroidectomy, with the result that this foreign body, containing certain substances, eventually found its way through the plaintiff's left tonsil and in transit caused her serious injury. The writ was issued in January, 1941, and in December of that year, at the first hearing which lasted for approximately five days, the jury returned a verdict for the plaintiff with £500 damages. This verdict was set aside as being against the weight of evidence, and special leave to appeal to the High Court was refused. (Hocking *v.* Bell, 42 S.R. 132.) In August, 1942, after a hearing of 13 days, the jury was unable to agree; and another disagreement followed in December, 1942, at a third hearing of seven days. Thereafter an application was made unsuccessfully to this Court on behalf of the defendant that judgment should be entered in his favour. (Hocking *v.* Bell 43 S.R. 154.) The fourth hearing commenced on the 30th November, 1943, and occupied 36 days. Additional evidence was adduced on behalf of the defendant, and it is claimed that there is further support for the plaintiff's case. On this occasion the jury found a verdict for the plaintiff with £800 damages. As a final result in these four trials, 12 jurors have reached a conclusion in favour of the plaintiff, and only four in favour of the defendant. In such circumstances it is, therefore, manifestly undesirable that a further trial should be directed, unless the interests of justice clearly demand the adoption of such a course.

The present motion asking for a new trial or, in the alternative, an entry of a verdict for the defendant, is based on 14 grounds. Under the first and second of these grounds the claim is again made that the verdict is against the evidence and the weight of evidence. The third ground that the verdict was perverse has been abandoned. The 4th, 5th, 6th and 13th grounds rest on the contention that the trial judge should have directed a verdict for the defendant and, accordingly, that this court should do so. The 7th, 8th and 9th grounds raise the question whether, having regard to the nature of the plaintiff's alleged course of action, the judge was in error in refusing to direct the jury that the onus lay on the plaintiff to satisfy their minds beyond reasonable doubt or, in the alternative, to a degree of comfortable satisfaction as to the truth of her allegations. The 10th ground is that the conduct of the action on behalf of the plaintiff was so improper that it was calculated to, and did in fact, prejudice the fair trial of the action. The 11th and 12th grounds are directed to the alleged wrongful admission of evidence. The 14th ground relating to damages has also been abandoned.

The plaintiff's case depends on a chain of inferences or presumptions of fact that is alleged to arise from and link together one admitted fact, and two statements of fact. These statements are of such a nature that with regard to them the jury were entitled to accept the plaintiff as witness speaking with belief in the truth of what she said, although the defendant's contention is that she is the victim of hallucination. In some circumstances, no doubt her evidence could be accepted in its entirety. In the first place, the admitted fact is that as an essential incident in the actual operation, a drainage tube was inserted by the defendant in the wound in the plaintiff's neck. The second focal point, which is a statement of fact, consists of the plaintiff's evidence on oath that the defendant, when proceeding to extract the tube on the second day after its insertion, said he would cut a stitch, then shook the tube, pulled hard, and later, putting one hand on the plaintiff's forehead, pulled harder and made some exclamation, threw what appeared to her to be a small black object on a tray, and walked away with the attendant sister. The third point, also a statement of fact, is that what happened caused pain, she became very ill, and continued to suffer for 18 months until something burst through her left tonsil, passing into her throat, was swallowed and eventually left her body through her fæces. This object she examined, but it was lost when the pan was emptied into the closet. Afterwards it was sketched by the plaintiff and described as a lightish grey-coloured tube, torn at one end, and containing two lengths of wire and what appeared to her to be something like a piece of marine sponge.

The inferences or presumptions of fact alleged to be deducible are that, as a rubber tube was not used in connection with the plaintiff for any other purpose than the operation, a portion of the drainage tube, after being broken, must have been left in the wound in her throat after the operation, that this portion of tube must have had in it when inserted, or must otherwise have collected the wire and sponge or a swab, and in this formation must have infiltrated through her neck, into and through the tonsil, caused her to contract tetany and to suffer other injuries. Having regard to the pleadings, the course of the trial and the evidence, two of these inferences have become basic, namely, first as to the tube being broken and if so as to anything being left in it, and second if this happened whether the movement of the foreign body in the neck between the two points from the thyroid to the tonsil occurred. Failure of either or both of these links in the chain of inferences whether totally or to the degree of such preponderance of evidence to the contrary, as to establish that the jury's verdict was such as reasonable men may not find, must therefore be fatal to the whole connecting chain and to the verdict that has been returned.

As the 7th, 8th and 9th grounds of appeal relate to the quality of the burden of proof which falls on the plaintiff, it is preferable that they should be discussed at the outset, as the conclusion is relevant to the consideration of the question whether the verdict is against the weight of evidence.

At an early stage of his address to the jury, Counsel for the defendant announced that, as the nature of the allegations relied on by the plaintiff was so serious as to amount to a charge of criminal negligence, a direction would be sought that the jury could not find a verdict in her favour, unless their minds should be persuaded to the degree of comfortable satisfaction as to the truth of her story. The learned trial Judge refused to accept this suggestion, and followed the usual practice in actions for negligence by directing the jury that they might determine the issues upon the balance of probabilities. In summing up he submitted the test in this form:

> As I have said . . . she must in this action, as plaintiffs have to do in all civil actions, make out her case to your satisfaction, or, in other words, the onus of proof lies on her. That means that she must weigh down the metaphorical scales in her favour, and must satisfy your minds in regard to the matters on which her case depends. She has not to satisfy you beyond reasonable doubt as in a criminal case, but she has to satisfy you by a balance of evidence, by a balance of probability, that she is entitled to succeed. From that it follows that, if she does so satisfy your minds to that extent, you will find a verdict for the plaintiff; if she so fails to satisfy your minds, then your verdict will be for the defendant, and if you merely come to the conclusion that what the plaintiff states is a possible view of the circumstances, but that you are unable to say that it is more probable than not that what she says was correct, then your verdict will be for the defendant, because in that case the plaintiff will have failed to weigh down the scales in her favour, or, put in another way, if, on a review of the whole of the evidence, you are unable to say which is the correct view to take, then the plaintiff will fail to discharge the onus of proof and your verdict will be for the defendant.

A little later, after mentioning the difference between inference and conjecture, His Honor said:

> You will remember also the comments made by Mr. Cassidy here that if Dr. Bell knowingly left the broken portion of the tube in the wound, as the plaintiff in her evidence asserts, he would have been guilty of something more than negligence, and his conduct would have amounted to malpractice and even to criminal negligence. Do you think it is probable, gentlemen, that such a man as Dr. Bell would have so acted?

Again, in referring to a comment by Counsel as to the lack of corroboration of the plaintiff's story concerning the portion of a tube passing through her throat, the judge added that if on a proper review of the facts they were unable to accept the plaintiff's evidence standing alone, they "would not be criticised for approaching with some degree of caution, to say the least of it, an important matter which depended upon the observation of a single individual, that single individual being very interested in the result". A further warning was also given that, "Counsel suggests that it must appeal to men of common sense that a defendant so situated should ask them to scrutinise very carefully indeed the allegations made in a court of law on a topic of great importance, which allegations are unaccompanied by the evidence of any eye witness except that of the plaintiff". Elsewhere in the summing up this additional passage appears:

> Mr. Shand was quite right in telling you that this case does not involve any charge of criminality, but merely involves a charge of negligence as I have outlined to you. If the plaintiff's evidence be accepted, then it does appear almost of necessity that Dr. Bell must have known the tube broke and that he left it in there, or at any rate made very little effort to recover the broken piece. Although, as I say, criminal negligence is in no sense an issue for you here, none-the-less it is perhaps not surprising that the defendant in these circumstances should take pains, all the pains possible, to dispute the plaintiff's allegations.

It is evident therefore that the learned Judge, whilst advising the jury that they might decide the issues upon the balance of probabilities arising from the evidence when tested by the metaphorical scale, he also, in substance, warned them of the seriousness of the issue and to use care in determining the comparative weight of particular portions of the evidence before applying the test, in order to find whether their minds were persuaded in favour of one party or the other.

At the conclusion of the summing up and after the jury had retired, the subject of onus of proof was again ventilated. Relying upon Sec. 54 of the *Crimes Act*, 1900, Counsel for the defendant contended that the real issue to be determined was one of criminal negligence which must be established beyond reasonable doubt. This section provides that whosoever by any unlawful or negligent act or omission causes grievous bodily harm to any person shall be liable to imprisonment for two years. A number of authorities were cited, but the Judge refused to make any addition to or alteration of his instructions to the jury, although Counsel for the plaintiff joined in requesting that he should decide in the defendant's favour on this point.

The rule as to the incidence and degree of the burden of proof in civil and criminal trials has been developed gradually in the course of a long history. So long ago as the early part of the 17th century the rule in civil actions was formulated that the Court itself can only give judgment on what is certain and not on what is uncertain: "But where the matter is so far gone that the parties are at issue, or that the inquest is awarded by default, so that the jury is to give a verdict one way or the other, there, if the matter is doubtful, they may find their verdict upon that which appears most probable, and by the same reason that which is most probable shall be good evidence: (2) Plowden, 412. Originally, it appears that in criminal trials guilt and not innocence was presumed, so that if a prima facie case was proved, no defence of an alibi or otherwise was permissible: Phipson, Evidence, Book 3, c.48. But at an early stage in the 18th century, not only had this presumption been reversed so that it should operate in favour of innocence, but in order to temper the rigours of punishment under the penal code the practice was introduced of demanding cogent evidence of guilt. This benefit at first, however, was only granted in criminal cases: Phipson Evidence, Book I, c.I. Thereafter, as Professor Wigmore says, it was applied in advancing periods in various tentative forms, such as a warning that guilt should only be founded upon "A clear impression" or that there should be "satisfaction", or "no rational doubt", or that there should be "rational and well-grounded doubt" before conviction, or that a guilt should be "beyond possibility of doubt", and then "beyond reasonable doubt", until Mr. Starkie evolved the formula applicable to all crimes, "moral certainty to the exclusion of all reasonable doubt": Wigmore Evidence, Vol. IX, p. 317, Sec. 2497. The rule has now been expressed in another form, namely, that an accused is entitled to an acquittal if there is any reasonably possible explanation of the evidence which is consistent with innocence: Peacock *v.* The King, 13 C.L.R., 619.

The subject of the effect of legal but rebuttable presumptions, such as that of innocence, legitimacy of children born in wedlock, and other instances within the same class, has also entered into the development of the rule as to the onus of proof in civil action, but mostly in relation to its effect on the incidence rather than the extent of the burden.

The Privy Council in 1855, when an issue of forgery arose in an action of ejectment, where the question of the validity of a deed came in question, said that the jury must weigh the evidence, consider all the probabilities of the case, not excluding the ordinary presumption of innocence, and must determine the question according to the balance of those probabilities. Two years later, in an action by a plaintiff to recover penalties under a Statute relating to bribery in Parliamentary elections, Willes J. even apologised for referring to what he described as the elementary proposition that in civil cases the preponderance of probability may constitute sufficient grounds for a verdict, and the Lords expressed no dissent from this opinion: Cooper *v.* Slade (6), H.L.C. 746 at 772. The same principle has been applied in an action of a burglary policy, where the defence raised was theft by a servant: Hurst *v.* Evans, 1917 (1) K.B. 352, and in actions against carriers, where the issue was whether the loss arose from the felonious acts of the defendant's servants: L.R. (9) Exch., 93; Boyce *v.* Chapman (2) Bing., N.C., 222. There appear to have been but few, if any, departures from this principle in actions at law by decisions of any weight. In one instance it is stated to have been said that criminal issues in civil actions must be proved beyond reasonable doubt: Thurtell *v.* Beaumont (1) Bing. 339. But all that was decided there was that the defendant had to prove exactly what he said: compare Brown *v.* McGrath, per Murray, C.J., 1920, S.A.L.R., 97, at 110. And in the United States the criticism of the Court of last resort in New Jersey was that in principle Thurtell *v.* Beaumont stood alone and unsupported in English Courts, except in libel and slander, which are to be regarded as exceptional and resting upon considerations peculiar to the nature of the actions and of the injuries for which they are brought. Four of the five judges, however, who delivered judgments in that case were not prepared to accept the qualifications as to libel and slander without further consideration: Kane *v.* The Hibernian Insurance Co. 23 A.M.Rep., 239. With regard to libel and slander, Tindell, C.J., appears to have directed a jury that in a plea of justification alleging forgery the same strictness of proof was required to convict the plaintiff as if he were in a criminal trial: Chalmers *v.* Shackell, (6) C. & P., 475. The point was not argued on appeal. A similar direction to the jury was given by Denman, C.J.,

where the plea of justification made in a charge of bigamy: Willmet *v.* Harmer (8) C. & P. 695. The reason for these two decisions appears to have been that the defence, by relying upon the allegation of a crime, was required to rebut the presumption of innocence, and this involved proof beyond reasonable doubt. These cases, as well as Thurtell *v.* Beaumont, and a number of others, were elaborately discussed in Ireland upon an appeal in an action to recover penalties. The majority of the Court said:

> The course generally adopted in practice by the judges has been, where the affirmative of the issue lay on either party, or where either party has sought to displace an existing right or to rebut a presumption authorised by law, to direct the jury that, before they find in the affirmative the issue or before they displace the right, or before they find against the presumption, they ought to be satisfied upon the evidence that the state of facts existed on which the parties seeking any of those results relied. And the jury, although they may consider the case a doubtful one, may, upon weighing the evidence and finding their minds sufficiently influenced by the preponderance of it on one side, be satisfied of the fact by that preponderance: [Magee v. Mark (11) I.R.C.L., 449 at 469.]

This pronouncement is in accordance with the opinion of the Privy Council in Doe d. Devine *v.* Wilson, where the additional warning was mentioned that the presumption of innocence should not be disregarded. As to this latter factor, so great an authority as Bowen, L.J., has cited with approval a passage appearing in Vest on Evidence, which suggests that proof beyond reasonable doubt is necessary to replace a rebuttable presumption of innocence. His Lordship said:

> The law presumes against illegality. The principle is, as laid down by Mr. Best, that no person shall, in the absence of criminative proof, be supposed to have committed any violation of the criminal law, whether malum in se or malum prohibitum, and this presumption holds in all civil and other proceedings for whatever purpose originated, and whether the guilty party comes in question, directly or collaterally, and, as far as I know, this principle is always acted on in the Courts: [The Hire Purchase Furnishing Co. Ltd. v. Richens (20) Q.B.D., 387 at 389.]

The principle as so stated, however, was not applied in that case in order to insist upon proof beyond reasonable doubt, but merely to determine that the onus of proof lay upon the party to prove illegality if he relied upon it, and the relevant facts were equally consistent with the transaction being legal or illegal. In the light afforded by the rule in Doe d. Devine *v.* Wilson, that must only mean that the presumption must not be disregarded, but there must be a balance of probability against it if it is to be overcome. The authorities referred to by Mr. Best (Evidence, Sec. 346) also, so far as they relate to civil actions, go no further except to state that the charge which raises the presumption must be specifically laid. Thus, where a crime was alleged which might lead to a forfeiture of dower, it was said by Lord Chancellor Talbot "The crime ought to be plainly laid to her charge, specified and put in issue, that she may know what to rest her defence upon": Sidney *v.* Sidney (3 P.W.M.S., 270 at 276). The decision was to a similar effect in Watkyns *v.* Watkyns (2 Atk., 96). Likewise it was held that where an act is required to be done by one, the omission of which would make him guilty of criminal neglect of duty, the law presumes the affirmative and throws the burden of proving the negative on the party who insists upon it and avers it in pleading: Williams *v.* The East India Company (3 East, 192); Affialo *v.* Lawrence (1903 (1) Ch., 318 at 326); (1904 A.C., 17 at 22); R. *v.* The Inhabitants of Twyning (2 B. & Ald., 386); Lapsley *v.* Grierson (1 H.L.C., 498). In the remaining two authorities referred to in Best, the point decided was that, as there is a presumption against fraud, the person who alleges it must bear the burden of proof: Ross *v.* Hunter (4 Tr. Reports, 33 at 38); Leete *v.* Gresham Life Insurance Society (15 Jur. 1161 at 1162). Because of the presumption of innocence and that moral culpability is involved, it has been said elsewhere that fraud must be clearly and distinctly proved by the person by whom it is alleged and on whom the onus of proof lies. But the House of Lords, in discussing this matter, did not mention that there should be criminative proof, if that expression means proof beyond reasonable doubt. Lord Chelmsford, L.C., said that a plaintiff alleging fraud cannot succeed unless he is able to prove his case as it is laid, and that the evidence failed to satisfy his Lordship's mind that the case was such as was represented. Lord Brougham expressed himself differently in saying that the Master of the Rolls, who tried the case, did not appear to have kept distinctly in mind upon whom the onus of proof rested. The person who alleges fraud must clearly and distinctly prove the fraud he alleges. Lord Cranworth agreed for the reason that the plaintiff nowhere stated on oath that he had been imposed upon, his sole witness was unreliable and the defendant denied the fraud: Mowatt *v.* Blake (31 L.T., N.S., 387 at 388). This decision was therefore based on the principle that fraud could not be presumed and must be precisely laid, but with the addition that the plaintiff should give evidence sufficient to satisfy or clearly satisfy the minds of the Tribunal. It may be that the reference to the test of clear satisfaction was taken from the criminal procedure applicable at the time; yet it could not be suggested that there is a stronger presumption against fraud than in favour of innocence of such crimes as forgery, larceny, bigamy, or suicide, which has been mentioned by Farwell L.J.: Bender *v.* Owners of S.S. Zent (1909 (2) K.B., 41 at 45). Consequently, there seems to be no special reason why the burden of proof should be different in cases of fraud from that in other civil actions. Prof. Wigmore is definite on the point that the idea has been generally repudiated that whenever in a civil action a criminal act is charged as part of the case, the rule for criminal trials should apply, and that it does not apply to an action for a statutory penalty, to a plea of truth to an action for a defamatory charge of a crime, nor to a plea of arson by an insurer in an action on a policy of fire insurance, nor in proceedings for disbarment or relating to bastardy, nor in actions for seduction, nor in proceedings for contempt; but a stricter standard in some such phrase as "clear and convincing proof" is commonly applied to measure the degree of persuasion for a charge of fraud, or of undue influence, or certain other issues mostly of an equitable nature: Wigmore, Evidence (Vol. 9, Sec. 2498).

The rule as to the test by the balance of probabilities where issues of crime have been raised has been followed in Victoria: Motchell *v.* Massoud (1926 V.L.R., 273), where an issue of forgery arose, but not directly on the pleadings; and in South Australia where there was an issue of bribery in an action of defamation: Brown *v.* McGrath (1920 S.A.L.R. 92). Until recently the same practice has prevailed in N.S.W. But in an application to remove the name of a solicitor from the rolls, which is a civil proceeding, it was said that the tribunal should not be satisfied of alleged acts, criminal in nature, such as grave fraud or crime, unless a preponderance of evidence is such as to establish it clearly: *in re* a Solicitor (58 W.N., 53). Although that proceeding was of a civil nature, there was punishment involved, and a similar ruling in such circumstances has been given in a proceeding for attachment for contempt: Scholes *v.* Helton (10 M.N.W., 15 at 17). Both these decisions also are consistent with the statements of the High Court in Briginshaw *v.* Briginshaw (60 C.L.R., 336).

There have been variations of the rule in the Ecclesiastical and subsequently in the Matrimonial Causes Jurisdiction. In the former the rule was stated to be that, "In cases where crime is imputed the presumption of innocence must prevail until guilt has been proved; and in proportion to the gravity of the charge and the rare occurrence of the crime imputed, it is reasonable to require more cogent evidence to overthrow the legal presumption of innocence. . . . It would be most unreasonable to find a verdict of guilty where there is simply oath against oath without any further evidence direct or circumstantial to support the charge": N. *v.* N. (3 Sw. & T., 234 at 238). The charge there was of sodomy, and a similar ruling has been given by the Court of Appeal: Statham *v.* Statham (1929 P., 131). Such a direction, however, would not require proof beyond reasonable doubt. Presumably, it would be sufficient to furnish adequate additional evidence to overcome the presumption of innocence, or an equality of balance of probability, to the extent of persuading the mind of the court or jury, as the case may be, to a sense of reasonable satisfaction. The inferences to be drawn from answers in cross-examination might be enough. A similar attitude was adopted as to adultery, which is not a crime in English law, but is of a civil nature under the acts dealing with Matrimonial Causes: Mordaunt *v.* Moncrieffe (L.R. (2) Sc. & Div. App., 374 at 398). Nevertheless, a requisite proof of the offence in the Ecclesiastical Courts appears to have been satisfaction beyond reasonable doubt: Ciocci *v.* Ciocci (18 Jur., 194, at 198); and a similar test until recently has been applied in N.S.W.: Doherty *v.* Doherty (34 S.R., 290). The law on this point has now been settled by the decision of the High Court that the minds of the jury must be persuaded to a degree of reasonable satisfaction: Briginshaw *v.* Briginshaw (60 C.L.R., 336). The Court, however, found the key to solve doubts on the subject in the words of the Statute that "Upon a petition for dissolution it shall be the duty of the Court to satisfy itself, so far as it reasonably can, as to the facts alleged". In N.S.W. the Statutory Provision is that the Court shall pronounce the decree if it is satisfied

on the evidence that the case for the petitioner has been proved. This variance in language would presumably make no difference.

The presumption of legitimacy of a child born in wedlock has also been considered in many decisions which seem to constitute a special class based on public policy. This presumption has expressly been said to be only rebuttable, not upon a mere balance of probabilities, but upon evidence which must be such as to exclude all reasonable doubt in the minds of the Court or jury, or upon evidence that is strong, distinct, satisfactory and conclusive: Gaskill *v.* Gaskill (1921 P., 425 at 433). And in a proceeding upon a claim under the *Workmen's Compensation Act*, when the question in dispute was the admissibility of evidence as to the paternity of the child, Lord Atkinson stated that the same considerations would apply as in a suit in which the issue of fact is the legitimacy of a child: Lloyd *v.* Powell Duffryn Steam Coal Co. Ltd. (1914 A.C., 659 at 740), cf. Russell *v.* Russell (1924 A.C., 687 at 710).

The general effect of all these authorities down to the time of the decision in Briginshaw *v.* Briginshaw is that in all civil actions at law the effect of any rebuttable legal presumption only falls for consideration when the issue from which it derives is precisely raised on the pleadings. Then the issue must be proved in substance strictly as it is laid by the party who relies upon it; and the determination may be on the balance of probabilities, except in case of fraud, or where there is an issue as to the legitimacy of a child born in wedlock; then, in the former instance that balance must be reached upon clear proof from the evidence, and, in the latter, perhaps upon proof beyond reasonable doubt. Similarly in civil proceedings involving punishment, as distinct from damages, but not including conviction of a crime, the same degree of proof must be found as in the case of fraud. That such a test in civil actions apart from these prevails is suggested by Best (Sec. No. 95), notwithstanding his later treatment of legal presumptions. The author, relying upon Cooper *v.* Slade, says:

> But there is a strong and marked difference as to the effect of evidence in civil and criminal proceedings. In the former, a mere preponderance of probability, due regard being had to the burden of proof, is a sufficient basis for decision; but in the latter, especially when the offence charged amounts to treason or felony, a much higher degree of assurance is required.

This is the same proposition that appears in Doe d. Devine *v.* Wilson, which now has been qualified slightly in Briginshaw *v.* Briginshaw.

In 1939, however, Lord Atkin, in presenting the opinion of the Privy Council upon an appeal in a civil action where damages were claimed for an alleged conspiracy to defraud the City of New York, and the Trial Judge had ruled that this charge must be proved as clearly as in a criminal proceeding, said: "The proposition of the Judge has been laid down time and again in the Courts of this country, and it appears to be just and in accordance with the law." The people of the State of New York *v.* Heirs of the Late John M. Phillips and Others (1939 (3) A.E.R., 952 at 955). The decision turned on another point, however, and Lord Atkin's statement has been explained as not having been intended to mean anything different from the rule as stated in Doe d. Devine *v.* Wilson: cf. Helton v. Allen (63 C.L.R., 691). The High Court in that case defined the principles to be applied in such cases in this way:

> Although the standard of persuasion required in support of an indictment does not apply, the jury must not disregard the gravity of the issue or lose sight of the consideration that reasonable satisfaction is not independent of the nature of the fact to be proved, as the graver the allegation the greater should be the strictness of proof demanded. Therefore, the jury should not make a mere comparison of the probabilities of guilt with those of innocence, but be really satisfied that the alleged offence was committed. Accordingly, the rule, as now stated, is that there are only two standards of proof, namely, reasonable satisfaction and satisfaction beyond reasonable doubt; when the law requires proof of any fact the Tribunal must feel an actual persuasion of its occurrence, or its existence, before it can be found. It cannot be found as a result of mere mechanical comparison of probabilities independently of any belief in its reality: [Briginshaw v. Briginshaw (60 C.L.R. at 361); Helton v. Allen (63 C.L.R. 691).]

The test as to the balance of probabilities still remains; but in future it will be unsafe to advise the use of the metaphorical scales. The jury must be directed to be certain that their minds are persuaded to a degree of reasonable satisfaction, having regard to the circumstances disclosed by the evidence that the balance of probabilities is one way or the other or neutral, and with the addition that if charges are made, the graver the charge the stricter should be the proof they should require.

Subsequently to the date of those decisions of the High Court, Lord Atkin again, in presenting the opinion of the Privy Council, repeated his former statement that fraud of the nature charged in the civil action that was under review, like any other charge of a criminal offence whether made in civil or criminal proceedings, must be established beyond reasonable doubt: Narayanan Chettyar *v.* The Official Assignee of the High Court, Rangoon (1941 (39) Allahabad L.J., 683). Unfortunately, this report is not available for perusal, but from the typed copy of the opinion of the Privy Council, with which this Court was furnished by Counsel, it appears that, as in the former case before the Board, whilst the charge made by the plaintiff was a fraud in the nature of a criminal conspiracy, the claim was rejected as the evidence disclosed no more than suspicion; so that the statement as to the onus of proof was really not necessary to the decision and must be regarded as falling within the comment made by the High Court in regard to the earlier dictum: cf. Helton *v.* Allen (63 C.L.R., 691 at 713, 714). This criticism disposes also of two decisions of the Courts in Queensland, which followed Lord Atkin's dictum: King *v.* Crowe (1942 Q.L.L. 288); Abrahams *v.* Catip (1942 Q.L. Rep. 26).

It would lead to much confusion if in every civil action for negligence where grievous bodily harm is alleged to have been caused, but an issue of crime is not precisely raised on the pleadings, it should be essential to advise the jury as to the effect of a presumption of innocence. For instance, if the defendant asserts that the plaintiff's evidence is perjured, a counter presumption of innocence would appear with disastrous hindrance to any clarity of explanation. Such a charge of perjury is really only an argument directed to credibility. Moreover, the question whether negligence amounts to crime presents in itself a difficult problem. Malice is a requisite element of the offence depending upon Sec. 5 of the *Crimes Act*, 1900, upon proof of indifference to human life or suffering or recklessness or wantonness. In addition, care will in any event be necessary in charging the jury that the degree of proof depends upon the seriousness of the injury sustained by the defendant's act; otherwise the effect of the proof of claims for damages under the *Compensation to Relatives Act* might result in serious injustice. In those cases the difficulty of procuring evidence is notorious, and yet as the injured person has lost his life, the statement in the particulars of the cause of action must frequently suggest the commission of manslaughter.

Substantially the learned Judge's summing up in the present case fulfilled the requirements of law inasmuch as whilst he did refer to the mechanical test of metaphorical scales, he also warned the jury of the gravity of the charge in a manner that would indicate that they should be reasonably satisfied in their minds as to the balance of probabilities before deciding that it was in favour of the plaintiff. There is, therefore, no reason for interfering with the verdict on this ground. In order to determine whether a verdict is against the weight of evidence, the Court, whilst not neglecting the important circumstances that the jury have the opportunity of observing the demeanour of the witnesses, must be satisfied that the verdict was so unreasonable as to establish that the jury has not really performed the judicial duty cast upon its members. This conclusion might be reached if the evidence is so overwhelmingly in favour of the defendant that reasonable men might not find in favour of the plaintiff: Mechanical and General Inventions *v.* Austin (1935 A.C., 346). It is necessary then to consider in the first instance the precise nature of the acts the plaintiff set out to prove and the comparative weight of the opposing set of evidence.

Upon request, particulars were given of the negligence charged in a general form in the declaration. Three of the questions asked and answered are especially material. First: "What act or omission on the part of the defendant during the post-operative treatment is it alleged constitutes the negligence on the part of the defendant on which the plaintiff relies?" The answer was: "The plaintiff will allege that she was operated on by your client in the lower region of the throat; that a piece of drainage tube was inserted in the wound by your client, and that this drainage tube was so negligently or unskilfully manipulated by your client that it broke, and that your client thereafter negligently failed to remove the portion of the said drainage tube remaining in the wound, with the result that the plaintiff developed a complaint, believed to be tetany in a very acute form, to such an extent that she was dangerously ill over a period of more than 18 months, and that she only recovered from this illness on the passing of this piece of tube into the gullet, whence it ultimately passed from the body *per rectum*." Second: "What is it alleged is the nature and description of the piece of rubber tube and, in particular,

the shape, size, length and colour thereof?" This answer was given: "A piece of soft rubber tube, about two inches long, greyish in colour, and had the appearance of having been in water for some time. It was cut off straight at one end and torn at the other. On the side was a straight cut in which could be seen what appeared to be a swab and wire protruding from the torn end of tube." Third: "With regard to the alleged passing of the piece of rubber tube, is it alleged by the plaintiff that any other foreign body was passed at the same time? If so, what are the nature and particulars thereof, and was such other foreign body attached or otherwise connected with the alleged piece of rubber tube?" The answer was: "See answer to previous question. The swab and wire appeared to be the only other foreign bodies passed."

Under Rule 102 of the Practice, particulars are deemed to be part of the record, and their object is to prevent the party desiring them from being taken by surprise at the trial. The plaintiff therefore must be kept within the limits of proof so defined: McSpedden *v.* Harnett (42 S.R. 116). Consequently, it must be accepted that the precise charge of negligence made by the plaintiff relates only to acts after the actual operation. It is also apparent that the case proposed to be made was that the object, consisting of the portion of the tube together with its contents, alleged to have been passed through the plaintiff's body, was identical with what was left in the wound. Read strictly, the description in the particulars indicates that what was seen in the cut in the tube was what appeared to be a swab and what were in fact wires protruding from the torn end of the tube. Moreover, that this meaning was intended is established by the reference to wire in the third answer in the particulars, and by the sketch (Exhibit C) that the plaintiff made of the object she claims to have found in her fæces. She said, in effect, that this sketch depicted the object as it appeared to her; and it offers no suggestion of anything but the wire protruding from the torn end of the tube.

Unfortunately, the learned Judge was not asked for a ruling on the construction of the particulars; so that in the various hearings the plaintiff in her evidence departed progressively from the precise description originally given until it assumed an entirely different aspect, and, eventually, the issue was allowed to go to the jury in a vague and ambiguous form. On the first occasion she said in cross-examination that there were two forked pieces of wire stuck into the swab-like material, and after swallowing it she felt the wire pricking in her stomach. In examination in chief in that trial she said she thought "it was wire—it was like wire". Similarly, at the second trial, according to her own description, there was a piece of greyish coloured tube, with two pieces of wire sticking out of it. In cross-examination she explained that one piece of the wire protruded about three-quarters of an inch beyond the top of the rubber and the other piece was a little shorter. An alteration was made at the third trial, when she repeated that there were two pieces of wire sticking out—like wires—but they were easily bent, and when she pressed them they would spring back straight. Finally, in the present trial she further elaborated the description by stating that the projections "looked like black wire, but when she bent it it would fly back straight. It was like horsehair and it would fly back straight. It looked like wire to me, but it could not have been wire." In cross-examination she admitted having said at a previous trial that a model tube, constructed at the time subject to her directions (Exhibit P), was a fair representation of what passed through her body; but she added that it was not like the object itself, as the rubber used was red instead of lightish grey coloured and she could not bend the wires, whilst a lot could be meant by saying it was a fair representation. Yet she did not object to the statement that one piece of the wire, or whatever was its nature, was one and one-quarter inches long and the other slightly shorter, or that it scratched in her stomach. Finally, before the jury retired the learned Judge submitted to them a question in terms following the particulars relative to what was left in the wound. The jury evidently were disturbed as to the meaning of the particulars, and, having given their verdict, said they had not answered the question in the words supplied by His Honour, but they had found certain facts in this form: "We find that the defendant left in the site of the operation a piece of rubber tube of a length somewhat less than two inches, cut off straight at one end and torn at the other, part of which tube had been cut down one side and from which protruded some material which looked like wire and a swab from the torn end of the tube."

In these circumstances, it is clear that there can be no justification for interference with the verdict merely because of this finding amounting to a departure from the precise terms of the particulars. The next step, therefore, must be directed to an examination of the evidence submitted in proof of the issue whether a portion of the drainage tube with its contents as described, or with those contents in any form, was left by the defendant in the site of the operation.

Undoubtedly, a tube two inches long, or slightly more in length, was used for the purpose of drainage as part of the operation that was performed. The incidents to which the plaintiff deposed as to the attempted removal of the tube have already been stated; but in this instance she omitted what she had said in the first trial, namely, that the small piece of rubber that the defendant tossed to the tray was about half an inch long.

The further facts and inferences or presumptions, in addition to this preliminary breaking of the tube, which are relied upon by the plaintiff's Counsel in support of the verdict, may be summarised in this manner: (1) The plaintiff thereafter developed a septic condition in the wound. (2) Subsequently she suffered from tetany more or less continuously for 18 months. (3) The tube and its contents as described in the particulars and in evidence eventually burst through her left tonsil into her throat, was swallowed and ejected in her fæces. (4) The erupted tube could have come from no other source than the wound in the neck. (5) The condition of the tonsil is consistent with the eruption of the tube. (6) The symptoms of tetany ceased after the eruption, and therefore were consistent with the presence of a foreign body in the neck. (7) Admissions are deducible from the conduct of the defendant and Dr. O'Hanlon, who attended the plaintiff after the operation, that portion of the tube was left in the wound. (8) Medical evidence establishes the probability of the passage of the tube from the thyroid cavity to and through the tonsil.

With regard to proof of portion of the tube and its alleged contents being left in the wound, the plaintiff is faced with many difficulties, apart from the doubts attaching to its subsequent wanderings through the labyrinth of obstructions between the wound and her tonsil. Both the medical witnesses supporting her version of what occurred would not concede even the possibility of wire being placed in the tube or used in connection with the operation. Dr. Welsh, who was formerly Professor of Pathology at the University of Sydney from 1930 until 1936, would not suggest that an object such as Exhibit P, the reconstructed tube, containing wires, could travel in the neck. He said also that it was not within his province to speak of the manner of extracting drainage tubes; but he agreed that if a swab were put in the tube it would defeat the whole object of drainage. Whilst he was giving evidence to the effect that in spite of the defendant's care something went wrong with the operation, there was an objection to evidence, and after argument His Honour said to the jury: "Gentlemen, Mr. Shand (the plaintiff's Counsel) says, although the Professor said something went wrong at the operation, there is no blame being attached by the plaintiff to the defendant in respect of that or anything else (*sic*). The negligence charge is 'leaving the tube in the throat of the description the plaintiff gave'." Such a statement must mean that there was no allegation of any negligence in the operation itself, as distinct from the subsequent conduct of leaving portion of the tube with its contents, however they came there, in the wound. Counsel for the plaintiff has repeated in argument to this Court that his case does not rest on any negligence in the operation, although he insists upon the possibility that something else besides the portion of the tube was left in the wound, perhaps by accident and not by actionable negligence.

Dr. Welsh went on to say that an object such as Exhibit P was never used in a thyroidectomy, as it could not be used, but he would not accept this model, prepared at a former trial, as being accurate, and when asked about the presence or projection of a swab in it, he would only say: "I don't know anything about a swab, I can't answer that question." And further, after being shown the hospital records stating that the tube had been removed from the wound, he said: "I am not assuming that there was any of the tube left in the wound." He added that he would not entertain such an idea.

Counsel for the plaintiff then introduced, with his witness Dr. Thompson, a theory that was presented to the jury that a swab may have been left in the wound and may have been stitched into the tube during the sewing up of the wound. The witness was asked whether, if stitching was employed, it would be possible for the stitch to go through the rubber tube, and despite objection, was allowed to answer in the affirmative. He said also that swabs are sometimes used to stop hæmorrhage, as a surgeon may have

to be satisfied with stopping it as well as he can, especially if the patient is in a bad condition and has to be got off the operating table. There was no evidence that the plaintiff had to be got off the table, although the defendant admitted he had trouble with hæmorrhage and the plaintiff was very ill. Dr. Thompson continued that the tube may have been inserted first and stitched in with the muscles by the needle. But he also repudiated the idea of wires and thought they were never there; also he said the so-called swab may have been merely detritus picked up in the intestine, and that he could not contemplate an object like Exhibit P, which was an exaggeration and a complete caricature of the plaintiff's original description. His answers on these topics were so evasive, however, that it is almost impossible to understand what he meant. But with regard to the idea of anything in the form of a swab or detritus being picked up in the course of the alleged passage of the tube through the neck or the body, Counsel for the defendant during his address was asserting that there was no evidence that the tube collected the wires and swab *en route* when Counsel for the plaintiff interjected that there was no suggestion of that kind. In this manner it was again made plain that the plaintiff's course of action depended basically upon the assertion that the tube, containing whatever articles were claimed to be in it, was left in the wound in that form. Consequently, as Counsel, in view of the evidence, could not maintain with any reason that wires and the swab or something like marine sponge, or anything of the kind had been placed in the tube by the defendant, he was forced to offer some other suggestion. Accordingly, he developed very ingeniously and at great length, despite incessant objection from Counsel for the defendant, a theory of possibilities that there was a great risk of stitching the tube into the muscle and great care had to be taken, but that, without charging negligence, this act was done by the defendant, so that the swab was caught up by the stitch and drawn through the small cut near the bottom of the tube. There is combined with this theory the further contention, as to which there is some evidence, that catgut dissolves in normal tissue, but does not do so in pus. Therefore it was urged that the catgut did dissolve partially, and the residue, being in pus, is represented by the two wire-like projections from the tube described by the plaintiff as having passed through her tonsil and into her fæces.

It is comparatively obvious that, having regard to the jury's finding in answer to the questions submitted to them, it is this theory of the plaintiff's Counsel they accepted. The idea of the wires and swab-like substance being in the tube originally or subsequently picked up was clearly abandoned in favour of the suggestion of pieces of catgut, a contention entirely new in all these proceedings. The passing hint that they might be horsehair was also cast aside. Perhaps propounding the theory that by its agency the swab could be drawn into the tube, required too vigorous a flight of the imagination.

As already mentioned, in view of the manner in which the facts were left to the jury, their verdict cannot be disturbed merely for the reason that they answered the Judge's question differently to its form of expression. But the plaintiff is confronted with much more serious objections. The requisites as to the nature of the evidence upon which a jury may base its finding are very clearly outlined by Jordan, C.J., in Bell *v.* Thompson (34 S.R., 431 at 436):

> In order that a jury may be entitled to find a verdict for the plaintiff, they must have before them sufficient evidence of every fact, the burden of proof whereof lies upon the plaintiff. It is not enough that the evidence affords material for conjecturing that the fact may exist, unless it furnishes data from which an inference can reasonably be drawn that it does exist.

The distinction between a conjecture and an inference was also referred to as it is described in Jones *v.* Great Western Railway Co. (4 T.L.R., 39 at 41):

> A conjecture may be plausible but it is of no legal value for its essence is that it is a mere guess. An inference in the legal sense, on the other hand, is a deduction from the evidence, and, if it is a reasonable deduction, it may have the validity of legal proof.

A mere scintilla of evidentiary value is likewise not sufficient: Rider *v.* Wombwell (L.R. (4) Exch., 32 at 38).

Far from the suggestion of Counsel as to the catgut and swab being stitched to the tissue constituting a reasonable deduction from the evidence, its quality is entirely to the contrary and is substantially negatived by the evidence. With regard to the catgut, the evidence is that in the operation there were so many stitches that there were more than 50 knots. There were two slides in evidence as Exhibit 4, which illustrate from the form of the wound the type of stitching which must have been necessary, and from all the circumstances the obvious inference is that the stitches must have been numerous, but with very short lengths of catgut. At least there is not the slightest assistance from the facts to support the claim that two pieces of such catgut, one and a quarter inches and an inch long respectively, could remain without any knots after the residuary portions had been dissolved in the sound tissue. If such remnants of catgut did get into the pus, it is obvious that they would be very short and probably include the knots which would be outside the tissue, and would not dissolve. As to the swabs, the evidence is given solely by the defendant himself. He said in cross-examination that there was hæmorrhage, and in such conditions he described the procedure which was followed. Pieces of swabbing are pushed into the wound. The blood has to be mopped up to get the field of operation perfectly dry. There are two types of swab, one large and the other small. The small swab (Exhibit 7) is just dabbed with the fingers on any bleeding point as it is a very delicate area. The large swab (Exhibit 5) is soaked in saline solution for wiping out the cavity. Everything has to be made dry before the muscles are drawn together. He agreed it was a long operation, and that he did not remember precisely whether the tube was inserted before or after the stitching of the muscles; but he used absorbent gut and not chromic gut, which takes longer to absorb and had not been used by him for years. Moreover, he said that when putting a horsehair stitch in the skin to hold the tube a cutting needle is used; the other has no cutting surface, and, if it struck rubber, it would be noticed. The tube is left very loose, and has to be held with the horsehair stitch and a safety pin at the surface to prevent it from slipping into the cavity. A small length of tube is left projecting to the extent of about a quarter of an inch. The jury, no doubt, have the right to reject the defendant's evidence; but there is nothing to suggest that the wound could be or was packed with swabs. In fact, such a procedure appears to be impossible. The swabs also are in evidence. Even the smaller of these articles is about six inches long by two inches broad and of double thickness. The large one is of quadruple thickness, and in dimensions about 14 inches long by 12 inches broad. Both are of loosely woven material, but obviously neither could possibly be drawn by a needle into the very small hole at the bottom of the tube, a sample of which is in evidence. Moreover, the hole cut in the tube is near its end, deeply inserted in the wound near the straight cut end described in the particulars. The tube itself is placed obliquely in a slightly upward direction, so that an attempt to pull the tube upwards by force would tend, as is indicated by Exhibit 1, to tear towards the bottom and not upwards, and the tube depicted by the plaintiff discloses no hole cut in the position where it would normally be placed. The plaintiff cannot merely, because of the plaintiff's statement that a particular type of tube with specific contents came into her fæces, even if it be assumed that the tube could only have come from the tube in the neck, therefore contend that the inference may reasonably be drawn that catgut and a swab were left in the tube, as such an inference is entirely in conflict with the only evidence of fact. At least, it must be said that the evidence is so overwhelmingly against such a conclusion as to render it unreasonable. In addition, it is futile for Counsel to contend that the tube was sewn into the muscles with the swab attached without alleging negligence on the part of the defendant in performing the operation, of which the insertion of the drainage tube forms part. The defendant, on Counsel's admission, was not called upon to meet any such charge. The change of the description from protruding wires to pieces of catgut is also used to explain why they were not noticed, if the top of the tube was broken as the plaintiff suggests. The further inference is suggested, of course, that they would only develop that protruding characteristic later, otherwise they would have projected well above the surface of the skin and could not fail to have been observed. Still an additional inference in this connection was suggested to the jury, namely, that although the ordinary tube is composed of thick rubber with considerable tensile strength and therefore would be very difficult to break in a longitudinal pull, this particular tube may have been perished. The evidence is, however, that whilst often tubes are sterilised by boiling after use and again employed in operations, they are always tested before being used again.

A further hindrance to unsupported deductions being drawn in aid of the plaintiff's story is found in connection with the alleged penetrating through her throat of the objects she described is illustrated by the evidence as to the anatomical structure of the neck as regards muscles, arteries, veins, glands and mucous membrane. Dr. Welsh accepted the evidence on anatomy given by Professor Shellshear, the Professor of Anatomy in the University of Sydney, and Dr. S. A. Smith, a former acting professor in that subject. Both

Dr. Welsh and Dr. Thompson regarded any such obstructions as being irrelevant, as they might be evaded, in their opinion, by being pushed aside or externally traversed by the tube travelling in the pus of an ambulatory abscess along the fascial planes of arteries, muscles and such structures until an easy point of access to the tonsil was attained. Dr. Thompson said he was not prepared to place any limit to the possibility of things in medicine, and characterised as rubbish and twaddle the evidence of a number of experienced surgeons and physicians, such as Dr. Poate, Dr. Ritchie, Dr. Marsh and Dr. Steele, who regarded such a movement through the neck from the thyroid gland to the tonsil as being impossible or, if hypothetically possible, at least without causing death or serious or permanent injury. Nevertheless, several of the defendant's medical witnesses expressed very definite opinions on the subject and supported them by powerful authority. Anatomically, Dr. Thompson described the position as being that the foreign body had only to move through the distance of about an inch from the top of the thyroid cavity to the angle of the jaw, and in that region there is a small triangle or compartment, which is only separated from the interior of the pharynx by a little fibrous and mucous membrane, so that there would be no real obstacle to permit anything passing from the neck into the pharynx. He did not say into the tonsil. This triangle is illustrated on Plate 43 of Dr. Jamieson's Illustrations of Regional Anatomy. The defendant was previously cross-examined on this point, and he and Professor Shellshear both explained that in the diagram the thick fascial plane, which is known as the pharyngo-basilar fascia, and which lines the inner surface of the constrictor muscle and anchors the pharynx to the base of the skull, had been stripped for the purpose of demonstration to students. Dr. Shellshear's opinion generally was that it is anatomically impossible for a foreign body to pass from the thyroid cavity without destroying bone, muscles or arteries. For instance, he explained that above the thyroid is the thyroid cartilege and then the hyoid bone, which lies across the trachea near the Adam's apple. Its position, with its right and left horns, is illustrated in Dr. Jamieson's Regional Anatomy, Plate 52; by Professor Spalteholz' Hand Atlas of Human Anatomy, Plates 632 and 302; and Sabotta-McMurrich's Atlas of Human Anatomy, Plate 447. In any movement laterally from the thyroid cavity a foreign body would meet the carotid artery in its sheath which is practically contiguous to the capsule of the thyroid gland, as shown in the last-mentioned work, Plate 558; and even more clearly in Dr. Sloan's Treatise on the Thyroid, figs. 29 and 32, pp. 238 and 244. Even if those obstructions were capable of being surpassed, Professor Shellshear added that there would still be the palato-pharyngeal and superior constrictura muscles to be penetrated before the tonsil could be reached. On this aspect reference was made to Dr. Todd and Dr. Fowler's article on the Muscular Relations of the Tonsil, pp. 355 and 359. Other illuminating illustrations also indicate the position of the tonsil in this connection, such as Sabotta-McMurrich's Atlas of Human Anatomy, fig. 333; Dr. Fowler's Tonsil Surgery, fig. 58; Professor Testut's Position of the Tonsils, Vol. IV, pp. 62 and 63, figs. 56 and 57; and Binnie's Regional Surgery, figs. 273, 274, pp. 497, 497. Dr. S. A. Smith made the position even more decisive in stating that this portion of the neck is a very compact structure in which there are no spaces, as all the important organs are held together. He described what he termed a division into three compartments of the neck. In the first is situated the thyroid gland, which is shut off at the top by the hyoid bone. The second is occupied by the complicated set of muscles, which have as their function the movements of the tongue and jaw. They are in three layers, densely packed together, and the tonsil inside at the back of the throat lies against one of these muscles, the superior constrictor. The third compartment runs upwards alongside the first compartment, and contains the main artery of the head and neck, and the main veins and main nerve of the heart, and the lymphatic glands. Some idea of the ramifications of these structures may be gathered from the illuminated films which were exhibited to the jury and to this court during the argument. Professor Shellshear said that the foreign body, to reach the tonsil, would have to move at least a distance of two and a half inches; and Dr. S. A. Smith added that its only course could be alongside the sheath enclosing the carotid artery, the jugular vein, and main nerve; but if it kept that course it would never reach the tonsil. The position of this sheath, blood vessels and nerve is very clearly illustrated in Dr. Sloan's Treatise on the Thyroid, figs. 29 and 32, pp. 238 and 234. The tube would not get near it, but would have to change its direction laterally, and then would still have to pierce the fascia of the constrictor muscle. This is the line which has been adopted by Dr. Welsh and Dr. Thompson. They had to agree with the view expressed by all the experts that the main artery could not be pierced in any form without complete disaster, and that if muscles are penetrated by pus in an abscess, nature has no method of restoring the destroyed tissue except with an inelastic fibrous tissue, which must give evidence of its existence in a deficiency of movement in the neck. Such a disturbance of muscles, therefore, could not have occurred, since there is no evidence that the plaintiff has sustained such a deficiency of muscular movement, although Dr. Thompson said she had informed him that at some stage there was an indication of such a defect. There is general medical agreement, however, that a foreign body in circumstances in which it is contained with pus in an abscess may make its way through and also along the fascia surrounding muscles and blood vessels. Considerable time, in fact, was occupied in questions as to the travelling capacity of a psoas abscess downward through the leg; but such an abscess is of an entirely different nature, and the locality and conditions referred to are not comparable. Professor Inglis, Professor of Pathology at the University, explained the difference, and also that for such an object as described by the plaintiff, contained in pus in an abscess, to travel through the neck for 18 months would not be consistent with continuance of human life, as the surrounding tissues would be matted together and eaten away. Such an abscess, he said, would inevitably cause death. Other experts said the abscess would be as large as a man's fist and contain as much as an egg-cup full of pus. And they insisted that with the presence in the neck of such conditions the wound at the site of the operation could not have healed completely as the plaintiff admitted it did several months before the alleged eruption of the tube from her throat. Actually, unless there is some possible reason warranting the acceptance of Dr. Thompson's contention as to the existence of one small triangular spot where there is substantially nothing but thin fibrous membrane and tissue to prevent the foreign body from reaching the pharynx, the evidence is so overwhelming, both anatomically and pathologically against the probability, or even possibility, of the plaintiff's story, as to render it entirely incapable of acceptance. Moreover, the evidence and illustrations referred to appear to demonstrate to a degree of complete conclusion that the tonsil lies in a muscular cradle with no point of exposure to such a field of mere fibrous or mucous membrane as is mentioned by Dr. Thompson: c.f. Sabotta-McMurrich, fig. 333; Dr. Todd and Dr. Fowler, pp. 355 and 359; Dr. Fowler's Tonsil Surgery, 358; and Professor Testut, Vol. 4, figs. 56 and 57. Even Dr. Thompson did not say precisely that the triangular area which he mentioned gave access to the tonsil itself, but only that there was no obstruction for anything passing from the neck into the pharynx. The plaintiff's claim is that it passed into and through the tonsil.

There is no question of the demeanour of the defendant's witnesses detrimentally affecting their evidence on the subject of the anatomy of the neck. Counsel did not attack them on this aspect, but relied upon general vituperation, charging that Dr. S. A. Smith and even Professor Shellshear were under the domination of the British Medical Association, and that, presumably, they were giving evidence which they knew to be false. In this connection he adopted an attitude which has led to the inclusion of a ground of appeal that the conduct of the action prejudiced its fair trial. It was even suggested to the jury by the Counsel for the plaintiff that they had more responsibility than just in a contest between persons, the suggestion being that it was a contest between the plaintiff and the B.M.A. In addition, he said that all this talk of the object having to go through muscles and organs was so much nonsense, and that had been admitted. Of course, no such thing was admitted, but the contention was based on a claim that the witnesses had admitted all the individual elements which made the passage possible. There were no such admissions having the effect claimed, or anything approaching that effect. A further unjustified comment was made with regard to evidence of another witness, Dr. Flynn. Counsel for the plaintiff informed the jury that we now know that his diagnosis of the plaintiff's earlier condition before the operation was all wrong. In fact, that statement was quite incorrect inasmuch as the diagnosis in question was supported by the evidence of Professor Inglis, at least in some substantial degree. Counsel maintained that he was justly entitled to use every effort in support of his client. But it must be borne in mind that whilst an advocate should be fearless in advancing the interests of his client, and is armed with many privileges for his assistance to that end, the arms he wields, as Sir Alexander Cockburn, C.J., remarked on one occasion, are to be the weapons of the warrior and not of the assassin. As to this phase of the appeal, whilst it appears to have

been most probable that an atmosphere of prejudice was instilled into the minds of the jury, it is regrettable to find that the references to the B.M.A. were induced in a considerable degree by some unfortunate remarks by the opposing leading Counsel. Moreover, it has been held that the only remedy in such conditions is to ask the presiding Judge at the time that the jury might be discharged: Fitzpatrick *v.* Walter E. Cooper Pty. Ltd. (54 C.L.R. 200). On the other side of the picture a further ground of appeal has been taken that both Dr. Welsh and Dr. Thompson were not qualified as expert witnesses because of their lack of experience in surgery, and especially in surgery connected with the neck in the vicinity of the thyroid gland. But both are highly qualified academically, and have had some experience, although possibly a long time ago, at least as spectators at such operations, so that their evidence is not open to the objection that has been taken.

The question then arises whether there is something more than a preponderance of evidence against the verdict so that it might not reasonably have been reached, namely, an absence of evidence justifying the entering of judgment for the defendant. Before reaching any conclusion on this point there are, however, several other matters to be considered. Examination of the transcript indicates that there was evidence before the jury upon which they would have been justified in finding that after her operation the plaintiff suffered from tetany. This fact, however, is neutral. That complaint, admittedly, is caused by inflammation of the parathyroid glands, preventing them from supplying calcium in proper quantities to the blood, and may have its origin not only through sepsis caused by the presence of a foreign body in the wound of the operation, but by many other circumstances giving rise to sepsis. A more important feature relates to a condition of the plaintiff's tonsil, in which it is said that there is found at the present time a hole through which such an object as the plaintiff describes could have passed. However, it would first have to reach the tonsil, and there is evidence which can otherwise account for the hole. There is very considerable doubt existing as to whether this hole establishes more than an inference that there was an abscess in the locality and that something came out of the tonsil as distinct from through it, which is a very different matter. The claim that the jury might find that the object described by the plaintiff was erupted through the tonsil, and that it could have come from no other source than the wound in the neck must fail if the evidence negatives or is inadequate to support the story that the objects like wire and a swab as described were in the tube when, and if it was, left in the wound. Nor could a finding of the jury include an inference that the tube and its contents could proceed without passing through and destroying anatomical obstructions in order to reach the tonsil if the evidence of Professor Shellshear and Dr. S. A. Smith supported by all the text books is correct. Furthermore, contentions based on alleged admissions to be deduced from the fact that when the defendant was faced with a charge by the plaintiff that he had been negligent in leaving portion of a tube in her neck, he did not deny the charge immediately, are far from being conclusive in effect. Such conduct may be, and frequently is, left to a jury upon the basis that it is a natural attitude to repudiate allegations of serious negligence, and failure to do so may point to guilt. A doctor is, however, sometimes in a very difficult position in such circumstances, as patients whose treatment has not been immediately successful are apt to make complaints without foundation, and, for their own protection, are humoured by the doctor in order to save them from nervous or hysterical outbursts. Something of the kind was suggested by the defendant in this case. But, in any event, to put such a possible admission at its highest, it could not include an admission as to the contents of the tube if the evidence negatives their presence and the passage of such a combined set of objects through the neck.

This court has already decided that where it is found that a verdict is against the evidence and the weight of evidence there is no power to grant greater relief than the direction of a new trial: Hocking *v.* Bell (43 S.R., 154). Where there is any evidence of fact from which the jury may draw reasonable inferences, however plain it may appear on the probabilities of the case or the balance of evidence that the jury fell into error, a new trial only can be ordered. Judgment can never be entered on the grounds that the verdict was against evidence. Unless the appellate court itself can draw inferences of fact under the procedure as altered in England by the orders made under the provisions of the *Judicature Act*: Banbury *v.* Bank of Montreal (1918 A.C., 626, at 664, 674, 675); Smith *v.* Chadwick (9 A.C., 187, at 193); Fitzpatrick *v.* Walter E. Cooper Pty. Ltd. (54 C.L.R., 200), per Dixon J. at 219; Hocking *v.* Bell (43 S.R., 154, at 159). But if the evidence given by the plaintiff is such that unexplained it could have mounted to a prima facie case, yet, when considered in the light of the defendant's explanation it could not be so regarded as capable of constituting a prima facie case, then a verdict might be entered for the defendant: De Gioia *v.* Darling Is. Stevedoring and Lightering Co. Ltd. (1942 S.R. I). In my opinion the present case falls within that ruling. The plaintiff's evidence calls for an explanation from the defendant, but that explanation which goes far beyond what appears in the previous appeal to this court so overwhelms the plaintiff's case as regards the two vital links in the chain of inferences which have been mentioned that it reduces the evidence as to the negligence charged to less than a mere scintilla. The defect in relation to an inference favourable to the broken tube together with its alleged contents being left in the wound may, perhaps, be regarded as the result only of overwhelming counter inferences or presumptions of fact; but the position of the tonsil relative to the bands of muscle surrounding it is an anatomical fact and there is nothing to indicate that these muscles were penetrated. A jury cannot, by its verdict, contradict an actuality as to these muscles, disclosed not only by the evidence of these experts, but by all the scientific text-books. A finding, for instance, could not be accepted that the plaintiff's neck was devoid of all these muscles in which the tonsil is cradled any more than a finding could be accepted that the earth is flat and not round, although some witnesses might be found to advance such a contention. Thus, the inference or presumption relied upon by the plaintiff as to the passing of the object through the neck is not merely overwhelmed by countervailing inferences, but is negatived, as a matter of fact.

For the reasons which have been given, therefore, in my opinion judgment should be entered for the defendant.

His Honour Mr. Justice Halse Rogers's Judgement.

This is an action against a surgeon to recover damages for negligence. Details of the claims have been set out and discussed in previous judgments of the Court. There have been four trials, and this is the third appeal.

At the first trial, the plaintiff obtained a verdict. That verdict was set aside and a new trial ordered, and an application for leave to appeal to the High Court from this Court's decision was refused. Thereafter there were two abortive trials. On the fourth, a verdict was returned for the plaintiff, and the jury made a special finding.

The charge against the defendant is that after a thyroidectomy he negligently failed to remove part of a drainage tube which had broken, and that consequently the unrecovered portion of such tube remained for a long time in the plaintiff's neck, causing damage to her health. The case depends upon the uncorroborated testimony of the plaintiff as to the breaking of the tube, and also that eighteen months after the operation a certain object was erupted through her tonsil. She claims that the only possible inference is that the object erupted must have been part of the drainage tube which admittedly was used after the operation.

Normally, a drainage tube is a plain piece of rubber tubing which is left in the site of the operation when the wound is sewn up. Its purpose, as the name indicates, is to facilitate the draining away of serous fluid. It is usual to remove it two days after the operation, and the removal, according to the evidence, is a matter of no difficulty. The plaintiff told a story—uncorroborated—of the use of force to effect the removal of the tube from her neck, and of the failure of the effort and the breaking of the tube. According to her story, there were subsequent probings of the wound, and she was not aware that part of the tube remained unrecovered, for eighteen months after leaving the hospital she was ill from time to time, there were swellings in her neck, and she had symptoms which led her medical witnesses to testify that she had been suffering from tetany. Then, after eighteen months, she had a spasm, and something seemed to burst through her tonsil. Later, this object was evacuated *per rectum*. Thereupon the symptoms of tetany disappeared and she soon recovered her health. The object which she said burst through her tonsil was "discharged" or lost in circumstances which have been alluded to in previous judgments. In order to succeed in her claim it was necessary for the plaintiff to satisfy a jury that this evacuated object was part of the drainage tube which had been broken. If she did that, it followed that the defendant must have left it in her neck, and her case was established. She could not give direct and positive evidence that anything had been

so left behind, but if she established the character of this object and that it could be part of a drainage tube, she could ask a jury to say that the inference was obvious.

So, at an early stage of the case, she was asked to give particulars and to describe what she claimed had been erupted. Her advisers had ample time in which to furnish the required description, for six months elapsed between the request and the reply. It was given in these terms:

> A piece of soft rubber tube about two inches long, greyish in color, and it had the appearance of having been in water for some time. It was cut off straight at one end and torn at the other. On the side was a straight cut in which could be seen what appeared to be a swab and wire protruding from the torn end of the tube.

The grammar is not good, and two readings have been suggested. Mr. Shand, for the plaintiff, claimed that the words "what appeared to be" qualified the word "wire" as well as the words "a swab", and read the particulars as "what appeared to be a swab" and "what appeared to be wire protruding from the end of the tube". Mr. Cassidy read it as indicating that what could be seen in the cut appeared to be a swab, and that there was wire protruding from the torn end of the tube. The latter is the way in which I think the particulars should be read; and in any event, if there is ambiguity it should be read against the plaintiff.

The importance of the particular is obvious; it is the foundation of the case, the claim being that what came out of the tonsil must have been left in the throat by the defendant. During this trial it was admitted that nothing could have been picked up during the passage from the thyroid cavity to the tonsil, so the claim was that this object, with appurtenances as described, must have been part of a drainage tube negligently left behind by the defendant.

The case for the defendant was a direct denial that he had broken the tube or left anything at all behind; but he also met the plaintiff's story by a body of medical evidence that there was no possibility that such object as described could have passed on the route suggested without fatal results or at least permanent damage to the plaintiff. It was further claimed that it was fantastic to suggest that such an object could have been part of a drainage tube.

From the beginning an attempt was made by Counsel for the plaintiff to read down the particular and to get away from the allegation that "wire" protruded from the tube. On the first trial the plaintiff said that this protrusion was wire, and then added the words "like wire"; but she went on to say that after swallowing the object she felt it pricking her stomach. Defendant's witnesses said, without contradiction, that this was an impossibility, as the stomach is an insensitive area, but the statement did indicate the plaintiff's insistence that the protrusion was something which could prick her. Professor Welsh, who was the only medical witness called for her at the first trial, refused to consider that such an object as described could have been used in connection with a thyroidectomy. On the second trial a model was made by Counsel from the description given, and this model was said by the plaintiff to be a "rough" representation or a "fair" representation, but she said that the wire was too thick. This model has been used on subsequent trials, and on this occasion it was marked Exhibit "P". Plaintiff's Counsel throughout have tried to persuaded the juries that her admission as to the resemblance of the object erupted to Exhibit "P" was not important, and that it was open to them to find that something different was left behind. At the third trial, Mr. Hardwick said to the jury that he would not insult their intelligence by asking them to find that the defendant left in the plaintiff's neck an object like Exhibit "P". It is not clear what case he was attempting to make, but Maxwell J. said: "I tell you that, substantially, that is the plaintiff's case, and it is of no avail to the plaintiff to suggest now at this stage, through her Counsel, but not in the witness box, that it might have been that a little piece of the end of another tube was left in. My responsibility is, in my sphere, just as great as yours, and I tell you, with a full sense of that responsibility, that the plaintiff's case is nothing but this, that an object, of which the one which Mr. Hardwick held in his hand was a fair representation, was left in her throat."

On this trial Mr. Shand in his opening was vague as to the object claimed to have been left behind. I find these passages in his address: "The tube, or part of the rubber drainage tube, was left right in the neck in the thyroid. . . . It looks as if what happened was that either when the wound was being stitched up with a circular needle like that, either a bit of the tube was stitched accidentally into the muscle or neck, or else one of the stitches went through this V-shaped cut and held it. . . . You will hear that knots of catgut were being discharged from the wound. That was where it had been stitched up. You will find significance in this: for some months after the operation knots of catgut were being discharged. It seems clear that ordinary catgut was not used, but some treated material was used. . . . It will appear reasonably clear what happened in this case. It was sought to remove the tube, and it broke off. Tubes are used over and over again, are boiled, and you know what happens to rubber under the circumstances. It happens to be the tube which perished. It broke off at the little V-cut. . . ." Then, after referring to the object erupted, he said: "Fortunately, although that is lost, that day she made a drawing of it. The drawing does not pretend to be to scale. She gave this drawing to Dr. O'Hanlon. She had had no experience in anything medical, and this is something which could not have been imagined." And, showing the drawing, he said: "These are the things which she said were like wire, and when you pressed them they bent down. They were *obviously not wire . . . probably gut.*"

So Mr. Shand departed from the particular and said that the things protruding were not like wire, even obviously not wire, and suggested gut.

When the plaintiff came to give evidence, she also departed from the particulars. She said: "I would say that it was a softish grey piece of tube like a piece of rubber which had been in water for some time. It was swollen. It was not smooth like a new piece of tube. It was a straight cut at one end. It was slit up within half an inch of the end, and it had in that opening a swab which I thought was a piece of marine sponge with a blackish looking stuff. It had come from the sponge and it looked like black wire, but when I bent it, it would fly back straight. It was like horsehair and it would fly back quickly. It looked like wire to me, but it could not have been wire."

On this occasion the defendant and his witnesses again maintained, as they had done throughout, that nothing of the description given or like Exhibit "P" could have travelled from the thyroid to the tonsil. The plaintiff's medical witnesses baulked at Exhibit "P". Professor Welsh renewed his protest against being asked to consider any such object in a thyroidectomy. At the end of the case the matter was put to Dr. Thompson, who then gave these answers:

> Q. You won't accept Exhibit P as being a fair representation of what was left in the throat? A. No.
>
> Q. And is this right. Your evidence as to probability does not apply to a thing of which Exhibit "P" is a fair representation? A. I didn't say that.
>
> Q. Well, do you say it, or do you not? A. Anything may be possible.
>
> Q. And what is the answer to that question. Does your evidence of the possibility of movement apply to that thing which is a fair representation? A. There are a number of ingredients in that.
>
> Q. Does your evidence as to the possibility of it moving apply to a thing of which Exhibit P is a fair representation? A. It is possible, but I don't think those wires were ever there.
>
> Q. But if they were there? A. It could still occur. It is possible. All things are possible in medicine.
>
> Q. In medicine? A. Yes, extraordinary things happen.
>
> Q. Are you contemplating that in your evidence of which Exhibit P is a fair representation? A. You could contemplate that.
>
> Q. But are you contemplating it? A. Not quite.
>
> Q. Are you? A. I don't know.
>
> Q. Doctor, I want an answer to that. Are you, or are you not. It may have important consequences. A. I don't think I can answer that.
>
> Q. I will ask you to answer it? A. I can't.

At an early stage of this appeal I asked Mr. Shand what it was that he had suggested to the jury had been left by the defendant in the plaintiff's throat. He referred me to two passages of his address. I set them out here in full because of the importance which in my opinion attaches to this part of the case. This is how he put it:

> While I am dealing with this matter, I want to deal with an aspect of the case that my friend spent a lot of time on. Of course, the plaintiff is bound by her particulars that she gives, but you have to regard her particulars from a commonsense and human point of view. . . . Let me remind you of this. When the plaintiff drew this sketch that you know of (Exhibit "C") she was undoubtedly a sick woman. . . . What is the use of pointing to this sketch and saying "These are steady lines"? We know that everyone has different ideas of measurement, and particularly women. . . . This is described by Dr. Bell when he sees it: "This is an excellent drawing—very good or excellent" . . . an excellent drawing of what? Of course, of a drainage tube. . . . I want you to consider this. Of course it is too big. . . . Of course it is about twice the circumference of a drainage tube. But if you put it all into the scale you will see what size it would be. It would be about half that size all round. . . . This Exhibit "P" was constructed. I am not complaining, because my

> friends are entitled to get all they can out of it. . . . It was said at first to be a rough representation, then a fair representation. The plaintiff in the box said "it all depends on what you mean by fair . . ." Here is the drawing, never seen by the plaintiff for two years. Is that a fair representation of Exhibit "P"? You see the V-cut where it has been torn—what has been described as a diamond cut. Where is the diamond cut in this? These fencing wires, as I satirically called them—how do they compare with those in Exhibit "P"? . . . This sketch is one of the most remarkable features in the case. She has no medical knowledge; she didn't know what the tube was like. She hadn't seen it put in, because she was unconscious, and yet there comes into being immediately when the tube has been lost, this drawing, which even the defendant says is a good drawing.

Again, Mr. Shand was vague. I don't know what was meant by asking the jury to regard the particulars from "A common-sense and human point of view". It seems quite inconsistent with his prevous admission as to her being bound by the particulars. Apparently he was abandoning the particulars and asking the jury to rely on the sketch—or rather something like the sketch, because "of course it was too big".

The learned Judge left to the jury this question:

> Did the plaintiff leave in the site of the operation the object substantially as described, that is a piece of rubber tube about two inches long, cut off straight at one end, on the side a straight cut in which could be seen what appeared to be a swab and wire protruding from the end of the tube?

Those were, of course, the very words of the particular. No ruling was given as to whether they should be read in the way suggested by Mr. Cassidy, or as Mr. Shand desired, but Mr. Shand asked that the question should not be left in that form because the particular was as to the object erupted and not as to what was left in the neck. That observation was, of course, perfectly sound, but it leaves me more than ever unable to appreciate what case Mr. Shand was making. It would seem that he was content to claim that part of the drainage tube must have been left in, but did not desire a particularity in description based on the plaintiff's story as to what came out. Yet if the object erupted had not been lost or discarded, it would have been necessary for the jury to decide whether that very object—and not something like it—was part of a drainage tube; and in the circumstances it was just as necessary for the jury to have a precise picture of what was erupted before they could decide on the fundamental issue. It was not sufficient for them to decide that something or other came out which might have been part of a drainage tube. The plaintiff's case depended on a finding that it *was* part of a drainage tube, and unless she satisfied the jury of that, her case must fail.

The jury, however, did not answer the question put to them by the Judge. The foreman said: "We have not answered the question in the words supplied by Your Honour, but we have found certain facts on that particular question, the answers to which I have here:

> We find that the defendant left in the site of the operation a piece of rubber tube of a length somewhat less than two inches, cut off straight at one end and torn at the other, part of which tube had been cut down one side, and from which protruded some material which looked like wire and a swab from the torn end of the tube.

If the jury had returned a verdict for the plaintiff without any special finding, the position would probably have been the same as on earlier appeals to this Court. If an affirmative answer had been given to the question which was put to them, it would again have been maintained that there was *some* evidence to support it, namely, the plaintiff's story and the medical evidence called on her behalf as to the possibility of the happening. Difficulties would probably have arisen on account of the abandonment of the claim that it was "wire protruding" in favour of "What appeared to be wire protruding", but no doubt it would have been argued strenuously that the particulars could be read in the very way which is now definitely claimed, that there had been no departure or abandonment, and that the suggested change of ground on the part of the plaintiff was a matter entirely for the consideration of the jury, and that no question of law for the decision of this Court was involved.

In the circumstances, however, the case stands on a different footing. The position now is that the jury has not found proved a case based on the particulars. They have departed from them and have found that the defendant left in the plaintiff's neck something which is described by them in minute detail. For their description they have made a kind of hotch-potch and have taken elements from the plaintiff's particulars, the sketch to which reference has been made, and the plaintiff's oral testimony on this trial. Apparently they have accepted the suggestion that the particulars are not to be read strictly, and no doubt they were influenced by the vagueness by which plaintiff's Counsel dealt with this part of the case. They have found a formula of their own—perhaps in order to get over the difficulties about which the plaintiff's witnesses were cross-examined.

The foundations of this case are uncorroborated statements of the plaintiff both at the beginning and at the end of the story, and an uncorroborated account of the disappearance of the object whose preservation would probably have prevented any controversy from arising. The defendant's case has necessarily been directed to a denial of the leaving of any such object and to the demonstraton of the impossibility of the travel of such an object so as to bring it from the thyroid to the tonsil. It is manifest that adherence to the particulars was of importance. Perhaps in response to the invitation to apply common sense and humanity, the jury has departed from the particulars and endeavoured to make a finding which avoids outstanding difficulties.

It might be claimed that the defendant is entitled to succeed on this appeal because the plaintiff failed to prove the case which, on the particulars given, she was bound to prove; but the defendant goes further and claims that in any event there is no evidence to support this special finding, and if upon examination of the whole of the record that is found to be correct, there is no need to pronounce on the narrower ground.

It must be taken that the jury accepted the plaintiff's story as to the breaking of the drainage tube and as to the eruption of something. On behalf of the defendant it is said, nevertheless, that the finding is founded on mere speculation or conjecture and is opposed to the evidence—the only evidence—as to medical practice and as to what happened at the operation. On all the medical evidence as to the character of drainage tubes used after a thyroidectomy it is unthinkable that an object of the description given by the jury could have been put in deliberately as a drainage tube; it follows that the jury have found that the defendant negligently left in the wound as a drainage tube a piece of rubber containing wire or something like wire and a swab—for it is admitted that these were not picked up after the wound had been sewn up. Another admission was made in the course of the trial which I take to mean that no negligence is charged in regard to anything done before the insertion of the tube and the sewing up. There is no evidence of any negligence after that stage was reached, but the case was made in this way. It was *suggested* that the defendant *must* have used a perished tube, and that he *might* have used some treated and insoluble material instead of gut for the sewing; and that he *must* have done the sewing so negligently that he caught up and sewed a swab into the tube (and incidentally prevented the tube from functioning). There is no evidence as to perished rubber; the only evidence as to the material used in sewing is that it was ordinary and proper, and the only evidence as to swabs is that they were of such a size that the sewing of a whole swab into the tube was impossible; and apparently it would not have been possible to catch part of one in the sewing without its being plainly visible. To reach their finding, the jury must have found negligence in regard to three important matters. On each of these they can have proceeded on nothing but conjecture. There was no evidence before them and nothing to lead then to conjecture except the plaintiff's story. If the plaintiff had been able to produce the object erupted there would have been a basis for *inference* by the jury: if she had satisfied the jury as to the exact description of that object the jury would have had a similar basis, but it is clearly not open to a jury to make a guess at the precise nature of the object erupted and then to make a series of conjectures as to how such an object could have been left at the site of the operation.

There is in my opinion no evidence to support the finding that the defendant left in the neck such an extraordinary object. As that finding was the basis of the verdict, it follows that the defendant is entitled to have that verdict set aside, and to have a verdict entered for him.

As I am of that opinion, it is not really necessary to consider the other grounds of appeal, but so much time was devoted to them before this Court, and the matters on which they are based occupied so much of the time taken at the trial, and so many important points are involved, that it is proper to state the views which I hold.

It is claimed that the jury's finding is against a greatly preponderating weight of evidence on the question of impossibility. The plaintiff's medical evidence is much the same as on the first and third trials. After reviewing that evidence on the earlier occasions I expressed the view that a finding for the plaintiff on it could not be reasonable. In this case it has been somewhat elaborated. The same two witnesses

were called as on the third trial. Professor Welsh spoke purely as a pathologist. He said that pus could go anywhere in the neck, and pus could carry with it a foreign body in any direction. As to the possibility of an object such as was described passing from the thyroid to the tonsil, I have already pointed out that he repeated his protest against being asked to consider that anything like Exhibit "P" had been used in a thyroidectomy. In cross-examination, he gave the following answers:

> Q. I suppose I may take it from you then that a thing of which that is a fair representation, could not move as suggested? A. I won't have that under any consideration.
> Q. Will you have the swab in it? A. I don't know anything about a swab.
> Q. Will you have anything sticking out of it at all? A. Not the wire.
> Q. Anything at all? A. I can't answer that question.

Dr. Thompson, who is a surgeon, was asked in his evidence in chief whether in his opinion it was possible for such an object to ulcerate through as was claimed, and his answer was: "It is not only possible, but in the circumstances in this case I think it is the most likely thing to happen." Towards the close of the case he was asked whether his evidence as to possibility applied to the movement of such an object as Exhibit "P", and he gave the answers which I have already set out. On the question of *some* object passing, he adhered to his former evidence, and stated that quite near to the tonsil there was a space occupied by nothing but fibrous or mucous membrane, and that the evidence of defendant's witnesses as to what might be called insuperable obstacles was incorrect. The evidence which he gave was illustrated by reference to certain diagrams. Here is what he said:

> Q. And you have already expressed your view about the ability of the tube to pass? A. There is no difficulty whatever in the tube passing from the thyroid through to the angle of the jaw, which is about an inch, a little bit over or under, as the case may be, because the only thing that lies in the compartment and separates it from the interior of the pharynx is the membrane, the mucous membrane of the pharynx. There is a triangle there under the angle of the jaw, and apart from the really fibrous membrane and mucous membrane there is no obstruction to anything passing from the neck into the pharynx. At that point is also the superior laryngeal nerve. That is a sensory, not a motor nerve. . . .

And he said, in reference to particular illustrations:

> These are accurate illustrations of the anatomy of the body. They are not pulled out of position to demonstrate things like you would in a diagrammatic illustration. Take 43 of Jamieson's Anatomy. Here is the space that I am referring to under the angle of the jaw. The lower border of the superior constrictor is inserted on the inner upper aspect, and the middle constrictor is inserted there (shown). There is the distinct triangle there, and here is the apex of it, and in that space there is the fibrous membrane, and in this there is mucous membrane. . . .
> Q. The jury want to know where the tonsil would be? A. Just under the angle of the jaw. If you compress the angle of the jaw, the angle goes down and gives you a misleading idea possibly about the tonsil, but the tonsil is just under the angle of the jaw. There is another diagram here, page 50, and that shows how the thyroid gland is in the visceral compartment between the pro-tracheal layer there, and the pre-tracheal, so it is behind the layer that Dr. Poate spoke about, and not in front of it, and you will notice there how it touches the gullet below and the pharynx above, so that there is nothing between the superior constrictor and the middle constrictor in the triangle except mucous membrane and the fascia on it.

The defendant and all the medical witnesses called on his behalf maintained (1) that an object such as Exhibit "P" could not pass on the line indicated, and (2) that the structure of the neck was such that even an ordinary drainage tube without the appurtenances described could not so pass.

Professor Shellshear, who is Research Professor of Anatomy at the University of Sydney, gave detailed evidence in regard to the anatomy of the neck, and explained his evidence to the jury with text-books and diagrams. He was asked this question:

> Q. It has been suggested in this case that a foreign body has passed by some means or other from the area of the thyroid to the area of the tonsil. Now, as an anatomist, is that anatomically possible? A. No.

Then in cross-examination he was asked:

> Q. Can you answer the pathological processes that would occur if pus spread upwards from the thyroid up towards the tonsil? A. I can, but not as an authority on the subject.
> Q. Very well, that is the proposition. Do you feel qualified as an authority to say what would happen if in fact suppuration spread upwards in the neck from the thyroid? A. Death.
> Q. As an authority? A. Yes—death.

Professor Inglis, who is Professor of Pathology in the University of Sydney, was asked:

> Q. As a pathologist, can you contemplate or accept the allegation that is made by the plaintiff in this case as being possible, and her still being alive? A. I cannot accept it.

Dr. Smith, who had been at one time Acting Professor of Anatomy, and at another time Acting Professor of Medicine, and who is now Director of Post-Graduate Medical Work in N.S.W., made in his evidence a detailed examination of all the regions of the neck through which the object was supposed to have passed. He likewise denied the possibility of the movement. He was asked:

> Q. To support the story that the infection continued there over a period of eighteen months, and of such a nature that it ate through the structures of the neck starting from there and going up and across the tonsil, does it assist in deciding whether this path of pus is possible or not? A. No, I regard it as impossible for pus to get from one side to the other. It could not do that without damaging the gullet or the windpipe. There is no space for it to get across, and if it damaged either of those two structures the patient would die. If it started this abscess from this compartment and got into the third compartment, those important blood vessels would be bathed in pus, and structures of that nature bathed in pus over a period of eighteen months would be very likely—I won't say inevitably, but it would almost certainly have been damaged as the walls of those blood vessels are made very thin and the wall of the artery is thicker, but even the arterial walls when bathed in pus do soften and degenerate in that way.

Dr. Edye gave similar evidence. Dr. Marsh said that in his opinion a body such as that described would not move at all. He was then asked various questions on the assumption that the object could move, and dealt in detail with the results from an assumed movement in various directions, and maintained that the whole theory of travel was impossible.

As already indicated, Dr. Thompson, in support of his evidence, referred to certain plates in Jamieson's Anatomy, and in particular to a small uncoloured triangle which, he said, indicated an empty space containing nothing but mucous or fibrous membrane. These same plates were shown on cross-examination to Dr. Bell, who stated that there was no empty space and that the triangle was shown uncoloured in the plates because certain things were being shown diagrammatically and that a lot of structures had been cut out. He claimed that the diagram is misleading. Professor Shellshear, on being shown the diagram, gave this evidence:

> Q. Will you look at this book "Jamieson's Illustrations of Regional Anatomy". Do you know the publication? A. Well.
> Q. Do you know the author? A. Very well.
> Q. You see that diagram 43. There are two little white spaces. It has been suggested that they are areas of mucous membrane? A. Then they have removed entirely from there the thick fascial plane which is shown as the pharyngo basilar fascia which lines the inner surface of the constrictor muscles which I think are previously mentioned and anchors the pharynx firmly to the base of the skull.
> Q. Does that diagram represent areas of mucous membrane? A. Not unless they have removed everything down to the mucous membrane in those areas. The picture is a diagram and it is to me a pharyngo basilar fascia, but I cannot say whether he has cut that out in his diagram. There is no evidence of it. It is a diagram for students. . . . Assume that some object, a knife or anything else, were being penetrated from beneath through the area, through the tissues to the tonsil, would you pass through any mucous membrane until you got to the tonsil? A. The tonsil itself is a modified mucous membrane. That is the first time you would hit the mucous membrane.

Professor Welsh, on being recalled, stated that he was prepared to accept Professor Shellshear's evidence on the anatomy of the neck. So, on the anatomical side the test is between Dr. Thompson on behalf of the plaintiff, and the defendant himself, Professor Shellshear, Dr. Smith, Dr. Marsh and Dr. Edye on the other side.

The question of the possibility of passage is primarily one of anatomy. Must the verdict of a jury be taken as conclusive on a matter of exact science such as the structure of the neck? Surely it is not a case of judging evidence on the demeanour of witnesses or their calibre! It must be a matter in which the question as to possibility can be answered definitely. On this appeal, both sides have used text-books and diagrams, and we have been invited to consider closely the anatomy of the neck, and we have done so. I am forced to the conclusion that the defendant and Professor Shellshear are correct in their evidence as to the uncoloured triangle relied upon by Dr. Thompson. Other diagrams produced to us show that all parts of the neck on the line of suggested travel are fully occupied—with no empty space. Dr. Smith said definitely that there is no

space for pus to get across. I regard Dr. Thompson's uncoloured triangle as a touchstone by which we may test the conflicting evidence, and I think that, using it in that way, and taking the totality of the evidence and the diagrams, we must accept the evidence given on behalf of the defendant. On the worth of the conflicting statements the Court itself must decide. If it were otherwise, on any technical or scientific subject a litigant would be at the mercy of a jury not qualified in any special way to decide technical questions, and quite possibly influenced by prejudice. Of course, if it could be shown that the scientific witnesses were biassed, there would be reason for discarding their evidence entirely. In this case I can see no reason for believing that witnesses for the defendant have for an ulterior purpose risked their professional reputation by forswearing themselves on matters of precise knowledge. It is worthy of note that Professor Shellshear and Dr. Smith were not cross-examined on their evidence as to anatomy—a matter not of determining importance in itself, but one to be taken into consideration: in the case of Professor Shellshear it is of the more importance because of Professor Welsh's acceptance of his statements. It is instructive to see how Mr. Shand dealt in his final address to the jury with the medical evidence against him. He claimed that although the defendant's medical witnesses all said that the movement of the body from one relevant place to another was impossible, all of them, or almost all of them, made admissions which supported the theory put forward by the plaintiff. He said:

> I indicated that I would put to you, and I will do it, this, it is easy to say a thing is impossible, very easy to say it, but it is harder to prove it, and I put it to you, and I will repeat it and give you chapter and verse for it, that although most of the witnesses called by the defendant say this is not possible—this tube passing in that area—it is not possible—I will show you that they have admitted all the individual elements which make it possible.

Mr. Shand thereupon proceeded to deal with the evidence of the various medical witnesses, and, taking one piece here and one piece there, he claimed that you had individual admissions as to different possibilities which showed that the movement claimed was possible: in other words, that his case was really admitted. It is necessary to point out that most of the admissions that were obtained were not in regard to the possibilities of what might happen in the neck, but were general possibilities touching pathological conditions in other parts of the body, and as I have indicated, the positive evidence of the people from whom he obtained these admissions on other matters was that movement in the neck, in the circumstances indicated, was not possible at all. After reviewing some of this medical evidence he said:

> And that is how it works. All this talk of having to go through all these muscles and organs is so much nonsense, and that is admitted.

The words "and that is admitted" have been much criticised by Mr. Cassidy in his address. It is clear that if they are intended as the submission of an argument, the argument is not well founded. To my mind it is impossible to regard the admissions he obtained as amounting to an admission that "all this talk of having to go through all these muscles and organs is so much nonsense". If the words "and that is admitted" are to be taken as a statement of fact—and that is how Mr. Cassidy wishes to read them—then it is obvious that they do not truly state the position.

This method of building up admissions and putting it to a jury of lay people that the total effect of such admissions is to prove the possibility of the plaintiff's theory is most unsatisfactory. In order that anyone should be able to decide how far the admissions really go, and how far an admission as to the movement of pus in one part of the body has a relevant bearing on the question before the jury, or how close an analogy there is between a psoas abscess and the abscess which must have formed in this case, and the inferences that can be drawn from the happenings in cases of quinsy—a considerable amount of medical knowledge would, in my opinion, be necessary. This mosaic of evidence of admissions obtained in the way I have indicated is to my mind of no weight against the definite expressed opinions as to the impossibility from the very people from whom the individual pieces were obtained.

To my mind, the evidence as to impossibility is convincing, and, reading it in its entirety, one cannot help coming to the conclusion that if that evidence had been properly considered and understood, the jury must have found for the defendant. At any rate, the weight in favour of the defendant is so preponderating that no reasonable jury could have refused to give effect to it.

Other grounds of appeal were raised and argued, which call for attention. Two of these are (1) that the conduct of the action on behalf of the plaintiff was such as to be calculated to, and did in fact, prejudice the fair trial of the action, and (2) that His Honour was in error in admitting certain evidence alleged to refer to the policy of the B.M.A. and the conduct of its members. The matters are closely connected. Obviously, if an issue could be raised as to the conduct of the B.M.A., it would help to prejudice the jury in favour of the plaintiff, and could be used to discredit the medical witnesses, and would serve to divert the attention of the jury from the real issue in the case. Mr. Shand was careful to suggest in his opening address that this was a struggle of the plaintiff against the combined forces of the medical profession. In the second paragraph of his opening address he said:

> The story will be told you by the plaintiff. You will realise that any plaintiff suing a doctor has a task ahead of her. The case will show you in the most clear way how difficult it is to secure evidence when you are opposed to a medical man, a member of the British Medical Association. Luckily in this case we have available to us the services of two brilliant medical men, one a Professor at the Sydney University, a man who has actually taught some of the doctors available to the defendant. We have another gentleman of undoubted attainments, not a member of the B.M.A., for reasons as to which I invite cross-examination—reasons which do him credit—who will be able to assist you.

The defendant's Counsel, by what I cannot help regarding as an incautious cross-examination of Dr. Thompson, gave that witness an opportunity of introducing statements as to boycotts by the B.M.A. of any doctor who gave evidence against medical men who happened to be defendants. In opening his case, the defendant's Counsel made what has been called a parade of the witnesses whom he proposed to call, and it was inevitable that when each of them appeared he would be asked whether he was a member of the B.M.A. It could be plausibly suggested that there was some ground for asking the question, because being a member of that body was something which would tend to influence the witnesses in favour of the defendant—in other words, would indicate bias. When the defendant was in the box, he was cross-examined at length as to whether or not he, as a member of the B.M.A. Council, approved of the attitude of the secretary of that body in advising the plaintiff's own doctor not to give a statement to her solicitors and on other matters connected with that doctor's conduct. That cross-examination was claimed to be relevant on the question of credit, and on that ground it was admissible. The cross-examination was legitimate, but to raise and put to the jury an issue on it was not proper. In his final address Mr. Shand said:

> The plaintiff comes to you, I suppose, on a path that has been littered with the gravest difficulties that it is possible to imagine a litigant to suffer under. She is the plaintiff in a case where medical evidence is necessary, where her own doctor is a traitor to her—a traitor, Gentlemen,—I will prove this—a lying traitor, this Dr. O'Hanlon—a traitor, not in the sense that he would not give evidence to help her cause, but he would not give her any at all. . . . But what happens then? He writes down to the B.M.A. and is told not to give her a report. That is all. Not a statement but a report to her legal advisers, because it might be misconstrued. And this is a body, this is a union, an upper union of professional men controlling these men on whom we rely for our health and our lives—men, most of them I suppose of the highest calibre. But what does this mean? The B.M.A. steps in and prevents a person's own doctor to whom she has gone and paid and relied on, from giving her any assistance,—even giving a report. . . .
>
> I was putting to you some of the difficulties that the plaintiff was suffering under. She had arrayed against her not only the doctors, through the B.M.A., but apparently also the University is lending itself, through these X-rays. They are obtained through the University and done by persons in the employ of the University, and in fact Professor Shellshear said that he did give every assistance he could. Apparently he had been giving advice from the beginning, although he has only given actual evidence on this occasion. All the nurses all available to the defendant. . . .
>
> It is pretty terrible, gentlemen, that in this community that kind of thing can take place, and in your hands in this case there rests more responsibility than just a contest between person and person. In your hands there rests a higher principle, to protect the right of every person to get a fair deal; because if it were a fact that a person who suffered at the hands of a medical man through his negligence were to be treated in that way—if it were a fact that he or she could not get medical assistance, then this country would not be what we call a democracy. . . .

The only way in which I can interpret that is that this is not a case between the parties before the Court, but a case in which the B.M.A. is on its trial. Nothing could be more calculated to distract the jury from the real issue

which they had to try than to put the matter to them in that way. It is difficult to see how the jury could properly decide the relevant questions after such inflammatory remarks. It may well be that they were induced by them to make a finding which, as I have indicated, is to my mind unreasonable.

It has been urged that such conduct justified the granting of a new trial. There is no doubt that ordinarily where the Court can see that the jury *must* have been influenced by the inflammatory speeches of Counsel, a new trial will be ordered (Chater *v.* Daily Mail Publishing Company: 18 T.L.R.), but in this case there are other matters to be taken into consideration besides this stressing of the position of the B.M.A. In the first place, the defendant's own Counsel gave a loophole for Dr. Thompson to introduce the matter of a suggested boycott. Further, Mr. Cassidy, in opening his cross-examination of the plaintiff, endeavoured to introduce equally irrelevant matter. He attempted to put before the jury what had been said by this Court in regard to the plaintiff's case—in order, as he explained, to get her reactions. That must have been done for the purpose of prejudice. Usually, when courts grant new trials, they are particularly careful to say as little as possible about the facts because of the danger of prejudice, but this Court felt bound to examine closely the evidence and to pronounce upon it. It is startling to find that an attempt was made to get its observations before a new jury as something which they might consider. No application was made for the discharge of the jury on account of any happening at the trial. The learned judge, in summing up, said:

> These are entirely false issues, calculated to divert your attention from this question, and to induce you to decide on considerations of prejudice rather than in the calm and impartial atmosphere in which alone, as I say, the real issue in this case can properly be decided. Unfortunately, in the existing state of the law, it is impossible to prevent such irrelevant and prejudicial considerations from entering into the case. They do so in many cases, often with disastrous results on the doing of complete justice between the parties. In this case, too, such instances of the kind occur to my mind. I refer to the question of what was called loyalty of the nurses to the doctors. As to the former matter, it was opened by Mr. Shand in his first address, was again raised by a voluntary remark by Dr. Thompson in the course of his evidence, occupied some of Mr. Shand's cross-examination of Dr. Bell and other medical witnesses for the defendant, and was referred to by Mr. Cassidy in his address, and was again stressed by Mr. Shand in his final address. . . .
>
> You should not allow such considerations to distract your minds from the task that you are required by law to perform, namely, to find whether or not the defendant has been guilty of the negligence charged.

Closely connected with this supposed issue of the plaintiff *versus* the B.M.A. is the allegation that all the medical witnesses except Professor Inglis and Dr. Tebbutt were in conspiracy to defeat the plaintiff's claim and that they had lied in the witness box. The making of such charges without foundation is one of the defects of jury trials, because it is a not uncommon practice to attempt to get cases decided, not on the evidence, but on prejudice. In this case, criticism of the defendant and of the doctors closely connected with the case was legitimate, but personal attacks on the witnesses who were called as experts was quite unjustifiable. They are men of the highest standing in the community and were entitled to courtesy at the hands of Counsel. Instead, they received insults. It is a very serious thing for Counsel to say to a man of Dr. Edye's standing in the community: "Have you any regard for your oath, Doctor?" or to suggest that there was no need to cross-examine Dr. Smith on anatomy because he had made an exhibition of himself, or to say deliberately that Professor Shellshear and Dr. Smith had forsworn themselves and were in effect prostituting themselves and their reputations in order that they might aid the defendant and in furtherance of a conspiracy against the plaintiff. These very serious charges should not have been made unless upon a sure foundation. It is advisable to call attention again to the ethical aspect of this matter, and to refer to the remarks of the Chief Justice in Oldfield *v.* Keogh (41 S.R., at p. 211).

The transcript shows that during the course of the case there was a welter of distractions and side issues. A perusal of Mr. Shand's final address shows the very large amount of time taken up in the discussion of matters which are on the fringe of the case. Some of these are irrelevant to the real issue, and touch only what may be called the minor issues. These seem to overshadow or obscure the vital question, which was simply whether the defendant had been guilty of negligence as charged. I have already dealt with the false issue that the case was really a contest between the plaintiff and the B.M.A. Other matters may be referred to briefly. A great deal of attention was devoted to tetany. Close examination and cross-examination on this subject was perfectly legitimate in view of the plaintiff's claim that she was suffering from tetany from the time when she left St. Luke's Hospital until after the eruption of the object, and that she became well almost immediately after. Apparently the manifestations of this disease are somewhat doubtful. The defendant's witnesses expressed the view that the plaintiff had been suffering from hysteria and not from tetany during the relevant period. The plaintiff's medical witnesses insisted that the symptoms pointed to tetany, and the matter became one of keen controversy. This in comparison was a minor issue, but so much attention was devoted to it that there was a possibility, or even a probability, that the attention of the jury was thereby distracted from the main issue.

Great stress was laid by plaintiff's Counsel on defendant's failure to repudiate the suggestion by the plaintiff's husband that the doctor left portion of a drainage tube in the plaintiff's neck, and on what had been called the defendant's reactions to the suggestion by Dr. O'Hanlon that perhaps the loss of the object erupted was a good thing for the defendant. There is no doubt that the failure of the defendant to repudiate these suggestions is ground for legitimate comment, and, to a lawyer, the defendant's attitude on these occasions is hard to understand or explain. If the issue before the jury had depended on which of two contradictory accounts of certain events they would accept, the defendant's silence would have been most important, and it would have been legitimate to ask the jury to draw an adverse inference from it; but in the peculiar circumstances of the case and in view of the medical claim as to the impossibility of the happening (which, as I have indicated, is convincing, or at the least is one supported by overwhelming weight of testimony), the defendant's failure to repudiate or discuss the suggestions is a matter of much less weight and not inconsistent with his sworn testimony. Of course, it was put to the jury by Counsel that his attitude was a confession of guilt, but if he knew or believed that the claim being made was founded on an impossibility, his conduct, though unwise, was capable of another explanation than that offered by Counsel to the jury. Ordinarily, of course, it would be for the jury to say what view they took of such conduct, but if the jury had found, as I think they should have found, that the story told by the plaintiff involved a physical impossibility, then this conduct could not have led them to find a verdict against the defendant. Consequently I am of opinion that, as the main issue should have been found for the defendant independently of any consideration of his conduct, this matter is one which they should have been warned not to consider until they had fully considered the medical testimony. If on that testimony there was an even balance or merely a slight preponderance, this matter of conduct would be of importance, but merely because the defendant had been foolish it was not open to the jury to find that the impossible had occurred.

Other matters which occupied a large amount of time and were the subject of much comment were Dr. O'Hanlon's correspondence, his refusal to give a statement, and his supplying to the defendant of certain facts as to the plaintiff's medical history. Mr. Shand put it to the jury that the B.M.A. had intervened to prevent Dr. O'Hanlon from telling the truth. After dealing with Dr. O'Hanlon's conduct he said: "That was the treatment she got, at the behest of whom or what body? I will show you that he did not want to do it. It was under instructions. He was convinced that this tube had been left in her neck, but there was a greater power than his honesty—there was a power that forced him." On these matters Mr. Shand had much to say to the jury, and he said it very forcibly, and in my view the case was won on issues of that kind.

Two other matters were raised in this appeal. The first concerns the proper direction to be given to the jury in a case of this kind. The charge went beyond negligence. It was put to the jury that after breaking the tube and failing to recover part of it, the defendant, through lack of moral courage, failed to disclose to anybody what had happened, and left to chance what the outcome would be; in other words, that he deliberately took a course of action which endangered the plaintiff's life. Mr. Cassidy asked that the same direction should be given to the jury as in a criminal case, that is, that the plaintiff must satisfy them beyond reasonable doubt. Alternatively it was asked that the issue must be proved to their comfortable satisfaction (Brigginshaw *v.* Brigginshaw). The learned Judge directed the attention of the jury to the seriousness of the allegations and the importance of the issue before them, but gave the direction which is usual in civil cases, and refused to alter

it. On this matter we stopped Mr. Shand. What was charged was negligence in leaving part of the tube in the throat. In itself, that was a simple charge of negligence. Incidentally, the charge of misconduct arose, but criminal misconduct was not pleaded, and was not, strictly speaking, in issue. I do not think that the other direction asked for by the defendant was proper. It is clear from the authorities so carefully examined by my brother Davidson that something different from the direction actually given was desirable, if indeed it was not necessary, but in view of the statements with which the learned Judge supplemented his direction, I would not be prepared in any event to direct a new trial on the ground of misdirection.

Another ground of appeal was that His Honour allowed Professor Welsh and Dr. Thompson to give expert evidence on medical matters on which, it is claimed, they were not qualified to speak. This ground was not strongly pressed by Mr. Cassidy after members of the Court had expressed their views, and we subsequently relieved Mr. Shand from arguing it.

The plaintiff's case began with an extraordinary story of man-handling by the defendant when she was in a weak state after a dangerous operation. To me it is an incredible story. It concludes with another strange story of an eruption through the tonsil, and the disappearance of the article erupted. It depends upon the theory of the identity of the article erupted with part of a drainage tube put into the site of the operation. To support her case, the plaintiff called medical evidence as to the possibility of that theory because it was thought that the inference necessary could not be drawn unless evidence as to possibility were tendered. The case then became involved in all sorts of side or minor issues, some of which I have mentioned. In the result, the jury found that the defendant left in the site of the operation a fantastic drainage tube. For the reasons I have given, I think that the verdict must be set aside and a verdict entered for the defendant. Consequently it is not necessary for me to consider what would have been the proper order if this Court had again merely come to the conclusion that the verdict was so much against the weight of evidence that no reasonable men could have found it. Nor is it necessary to consider the cumulative effect of the several unsatisfactory features of the trial to which I have referred.

His Honour Mr. Justice Roper's Judgement.

Two vital aspects of the plaintiff's story in this case are attended by circumstances of extreme improbability. In the first place, her evidence necessarily involves that portion of the drainage tube was left in the site of the operation by the defendant, a competent surgeon, with his knowledge, and as he also knew with the knowledge of one other person. It is necessary to find further that the defendant knowingly took the extreme risk of detection of the presence of the foreign body by another doctor when he allowed the plaintiff to leave the hospital and to pass out of his immediate care. Apart from the medical evidence as to the possibility of the passage of the tube from the site of the operation through the body, this I think is the most improbable aspect of the plaintiff's story. The other aspect which is attended with extreme improbability is her story as to the actual passage of the tube and the losing of it. Notwithstanding these improbabilities, two juries have each found a verdict which necessarily involves that they have accepted these aspects of the plaintiff's evidence as being the truth. Two other juries have each disagreed on the issues submitted to them. There are some facts in the case which any jury of reasonable men on the evidence could readily have found in the plaintiff's favour, and which serve to mitigate the improbabilities in her evidence to which I have referred. One outstanding matter is that it was clearly open on the evidence for the jury to find that for a period of nineteen months after the date of the operation the plaintiff was extremely ill, and that the illness was due to some infection in or around the site of the operation, and that from the time when she asserted that the portion of tube had passed through her body she recovered rapidly and has had no recurrence of the particular illness which afflicted her before. One other fact which I think it was open to the jury to find, without any possibility of the finding being successfully challenged, was that the plaintiff's left tonsil exhibited some indications which are consistent with the possibility of the tube having passed through it. In approaching the question of whether the plaintiff's evidence as to the passage of the tube is objectively true, I think that the jury must have found that the plaintiff was ill up to the time she says the object passed and that she recovered shortly thereafter, and that her tonsils did have the indications to which I have referred; and it must have given great weight to this view of the facts. If the defendant's case had rested solely upon evidence in denial of the plaintiff's evidence of fact and upon the improbabilities inherent in her story, it is clear I think that the verdict in her favour would stand. The case, however, went much further than this, and it was sought to show that the inference which follows the acceptance of the plaintiff's story, namely, that the tube which she says passed through the body must have come from the site of the operation and must have been left there by the defendant in circumstances establishing negligence, was an inference which could not be drawn because the passage of the tube from the site of the operation into the plaintiff's throat was a physical impossibility. Evidence to support this conclusion was given with great medical detail by a number of eminent and highly qualified experts. They were all subjected to searching and difficult cross-examination, which on my view of it failed to shake their opinions. If this evidence has the quality of establishing impossibility to the degree of mathematical or scientific certainty, the plaintiff's case must fail, because an inference essential to its success cannot be drawn. If the evidence, without establishing certainty establishes a preponderating degree of probability sufficiently overwhelming to lead to the conclusion that reasonable men properly applying their minds to the whole of the evidence could not have drawn the inference necessary to the success of the plaintiff's case, the verdict in favour of the plaintiff must be set aside.

It is necessary, therefore, to consider whether this evidence does establish a case of certainty or of preponderating weight. I have considered it with care, and in my opinion it does not establish a case of scientific certainty. It has no empirical basis, the presence of foreign bodies of the nature of the one involved in this case in the neck being a matter of which there is no recorded experience. It does establish with certainty that there exists between the site in which the tube was alleged to have been left and the point at which it is alleged to have been erupted into the throat structures of various kinds which prohibit the free passage of the tube from one of those places to the other, but to my mind it does not establish with certainty the impossibility of that passage notwithstanding the existence of those structures.

The weight of this evidence is very great, and there is another matter as to which the evidence for the defendant has, I think, even greater weight, namely, that assuming the possibility of the passage of the object from the site of the operation to the throat that would be attended by destruction of muscular tissue to such an extent that the plaintiff must thereafter suffer from and exhibit permanent physical disability which was not present at the time of the trial. Against this body of evidence has to be set the evidence of two experts called for the plaintiff. Their evidence is that the passage of an article of the nature of that described by the plaintiff from the site of the operation to the site of the eruption is a physical possibility without necessarily incurring the death of or permanent visible physical defect in the plaintiff. I think, however, that the evidence in support of the contrary view is overwhelmingly strong and (to adopt the test as expressed in Bell *v.* Thompson, 34 S.R., 431 at 437) that it preponderates so strongly in favour of the defendant as to lead to the conclusion that the jury in finding for the plaintiff have either wilfully disregarded the evidence or failed to understand and appreciate it.

At the conclusion of the summing up the trial Judge left a question to the jury framed upon a passage contained in the particulars furnished on behalf of the plaintiff. The question and the particular upon which it is framed and the precise form of the jury's answer are set out in the other judgments in this case. Particulars are furnished to indicate clearly to the defendant the case which has to be met, and to limit the evidence which can be called in support of it. The particular upon which the question was framed was not strictly part of the particulars of the alleged negligence, they being "that a piece of drainage tube was inserted in the wound by your client and that this drainage tube was so negligently or unskilfully manipulated by your client that it broke and that your client thereafter negligently failed to remove the portion of the said drainage tube remaining in the wound". The particular on which the question was framed was an answer to a question seeking particulars of the tube passed by the plaintiff. From the conduct of the case, however, together with the particulars furnished, the plaintiff's allegation was that what was passed was identical with what was left in the site of the operation, subject to some possible change in colour and in appearance allegedly due to its immersion in fluids in the

body. It appears to me that a finding not based precisely upon the particulars furnished does not necessarily deprive a plaintiff of the right to a verdict, and I agree with Davidson J. that the particular variation introduced by the jury in this case would not, if that were the only matter in issue, prevent the plaintiff from holding the verdict.

I also agree with Davidson J. as to the other grounds raised by the motion and think that the appeal should succeed only on the ground that the verdict was against evidence and the weight of evidence for the reasons given in the appeal from the third trial in this case (Hocking *v.* Bell, 43 S.R., 154); this, I think, should lead to an order for a new trial; but as the majority of the Court is of the opinion that a verdict should be entered for the defendant, I think it is unnecessary to consider whether any, and if so what, terms should be imposed as a condition for granting a new trial in the circumstances of this case.

Correspondence.

IRRITATION PRODUCED BY THE PROCESSION CATERPILLAR.

SIR: It is surprising that Dr. Flecker (THE MEDICAL JOURNAL OF AUSTRALIA, August 5, 1944) did not learn from those he consulted that the poison of the procession caterpillar was studied years ago by that great French naturalist, Henri Fabre. He will find it, if he can get the book, in "The Life of the Caterpillar", translated from the *Souvenirs Entomologiques* by Teixeira de Mattos, published by Hodder and Stoughton.

Fabre showed that the irritant in the nests was soluble in ether and was contained in the caterpillar droppings. (The caterpillar's sanitation is as low as a Japanese soldier's.)

He found it common to many other insects, but not to animals or birds.

If Dr. Flecker has not met Fabre he will find him a naturalist after his own heart, of a type nowadays all too rare. I fear he will have difficulty in buying his books; they are long out of print, and those who have them treasure them too closely.

You cannot quote Fabre, unfortunately, in these days of paper shortage, he will not bear cutting down, but the following is a short sample:

> These first inquiries lead us to conclusions which themselves are very remarkable. All caterpillars excrete an urticating matter, which is identical throughout the series. But, if the poison is to manifest itself and to cause us that characteristic itching, it is indispensable that the caterpillar shall dwell in a community, spending long periods in the nest, a silken bag laden with droppings. These furnish the virus; the caterpillar's hairs collect it and transfer it to us.

Yours, etc.,

S. F. McDONALD.

"Craigston",
217, Wickham Terrace,
Brisbane.
August 9, 1944.

THE MODERN MANAGEMENT OF PROSTATIC OBSTRUCTION.

SIR: The article by R. J. Silverton entitled "The Modern Management of Prostatic Obstruction" (THE MEDICAL JOURNAL OF AUSTRALIA, July 22, 1944) contains much that cannot go unchallenged.

In approaching any major surgical procedure the "moonlight and roses" frame of mind is to be condemned, no matter what degree of self-confidence is enjoyed by the surgeon. Regarding prostatic resection, Dr. Silverton says, "the after treatment is simple; it is just a matter of preventing the retained catheter from becoming blocked". It has always been insisted by the expert resectionists anywhere, that the after care of the patient who has been resected, and who is often old and debilitated, must be meticulous and the surgical principles as completely understood as in the open operation.

Further, in the section dealing with carcinoma, it is stated that "removal of the testicular tissue has a continuous, smooth and permanent effect". That conclusion is at absolute variance with the scientific observations of urologists the world over. Admittedly the benefit in some patients is temporarily dramatic, but not in all. No series of cases has yet been published in which there have been sufficient survivals for five years to warrant in any way the above use of the term permanent. At present the hormonal approach in therapy is imperfectly understood, so that haphazard and over-optimistic statements whether in medical journals or the lay Press are to be deplored.

One draws the conclusion from the section on the technique of resection that in the hands of the author all neoplastic tissue is removed, a claim which is undoubtedly extravagant and misleading.

A suggestion that many American urologists are careless of hæmostasis must be based on hearsay. My actual experience is the reverse.

Finally, in the indications for resection one would hesitate to operate on all males whose urinary stream is less than it was twenty years ago, unless bladder neck obstruction be confirmed by the complaint of difficulty and hesitancy or the findings of bladder trabeculation and residual urine. After all resection of the prostate gland is a surgical operation causing some discomfort, requiring an anæsthetic and costing some money, apart from an occasional death, so that lacking clinical indications, patients who can only pass urine one foot beyond their toes might find it easier when ordinary modern conveniences are lacking to stand with their feet a little farther apart.

Yours, etc.,

KEITH KIRKLAND.

B.M.A. Building,
135-137, Macquarie Street,
Sydney.
August 11, 1944.

A REBATE IN TAXATION.

SIR: Under the legislation recently introduced to provide for the change-over from the old system to "pay-as-you-earn" taxation, a rebate of 75% is given on taxation for the year ending June 30, 1944.

The rebate is applicable where the taxable income (*a*) does not exceed £500; or (*b*) exceeds £500, but does not exceed by more than one-fifth the taxable income for the year ended June 30, 1943.

Where the income exceeds £500 and exceeds by more than one-fifth the taxable income for the year ended June 30, 1943, the rebate of tax to be allowed will be:

Three-quarters of the tax calculated at current rates on a taxable income equal to the taxable income of the year ended June 30, 1943, increased by one-fifth of that taxable amount—for example: Taxable income for year ended June 30, 1943, £800; taxable income for year ended June 30, 1944, £1,200; gross tax payable on £1,200 at 90·5167 pence, £452 12s.; less rebate of 75% of tax on £800 plus 20% (that is £960); gross tax on £960 at current rate of tax, viz., 84·2875 pence, £337 3s.; 75% of £337 3s., £252 17s.; net tax payable, £199 15s.

It will be seen that the 75% rebate is not generally applicable, and for this reason members are advised to seek expert advice, especially those who have returned to practice from service with the armed forces.

It is to be noted that the Commissioner of Taxation has been granted discretion under the act in the matter of assessing the taxation.

Yours, etc.,

J. G. HUNTER,
General Secretary, Federal Council of the British Medical Association in Australia.

135, Macquarie Street,
Sydney,
August 22, 1944.

THE TREATMENT OF INGROWING TOENAILS.

SIR: *"Il n'y a rien de nouveau sous le soleil."* The Gallic dressing may help conceal the starkness of this old *cliché*, whilst we render it hurriedly and very freely as: who seeks originality faces a hard task.

This thought was engendered on reading, in recent issues of THE MEDICAL JOURNAL OF AUSTRALIA, an article by Major Wilson, a rejoinder by Dr. Coppleson and an amending letter by the former, all in relation to an operation designed for the relief of ingrowing toenail.

I was sufficiently interested to consult the records of Saint Vincent's Hospital, to ascertain approximately at what stage

of my surgical career I had given thought to this humble subject in an attempt to devise an operation, which, being based on the essentials of anatomy and pathology, would solve the problem of how to extirpate efficiently a great toe or other nail.

I found that on August 8, 1927, my house surgeon had described an operation carried out on D.H., a female, aged twenty-one years, dressmaker, suffering from ingrowing nails on each great toe. The text was accompanied by a thumb nail, perhaps a toe nail sketch would be more apposite, which indicated two incisions so placed as to allow the skin overlying the root of the nail to be reflected proximally to expose the latter. The text described the turning back of this flap and continued, "the whole nail was removed with the nail bed so as to be sure of non recurrence". This description is inaccurate, since what actually was removed in one piece by careful dissection in a bloodless field was the nail and the root of the nail.

This is the first account I can find of the operation, which I devised at least seventeen years ago, and have practised ever since for the relief of ingrowing toenail.

The purpose of this letter is neither to question Dr. Coppleson's claim to have worked out this technique independently nor to put forward one of my own in respect to any priority in the matter of devising the operation. It would indeed be straining credulity over much to imagine that such a simple and fundamental procedure would not have occurred to any of those of our surgical forebears, who, casting text-books aside, insisted on using a technique based on the essential foundations of anatomy and pathology.

The object in writing is revealed in my exordium; it is merely to point a moral.

Yours, etc.,

143, Macquarie Street, Sydney,
August 21, 1944.

D. J. GLISSAN.

SUDDEN BLINDNESS AFTER EATING FINGER CHERRIES (RHODOMYRTUS MACROCARPA).

SIR: I was much interested by H. Flecker's article about finger cherries. Some fifteen years ago there was a medical congress held in Sydney, and I brought down from Maitland a miner who gave a history of having eaten "finger cherries" when at a picnic in Queensland some forty years previously. He informed me that some of the picnic party died and others went blind.

On examination, this man, who was still carrying on active work at the coal face successfully, proved to have no central vision at all. The visual fields were full. Both optic disks were pale. Dr. Lockhart Gibson saw the case and thought that it was a case of lead poisoning, as he did not believe in the "finger cherry" theory. However that may be, it is rather interesting to observe that a miner working with a pick at the coal face does not need macular vision and evidently uses the rods and not the cones, thus throwing some light on the ætiology of miners' nystagmus which I think is caused by the abandonment of macular cone vision in favour of peripheral rod vision.

I am enclosing a copy of a letter written by Charles E. Lucas, D.S.O., to Captain W. T. C. Firth of the S.S. *Canberra*. This document came into my possession at the time of the medical congress and is further evidence of the toxicity of the "finger cherry".

Yours, etc.,

Newcastle,
New South Wales,
August 24, 1944.

ARTHUR D'OMBRAIN.

[COPY.]

Babinda,
June 24, 1929.

Captain W. T. C. Firth,
S.S. *Canberra*.

Dear Captain,

Some time ago I received a note from the proprietress of the Fairybower tea gardens, Kuranda, and she requested me to send you a sample of Finger Cherries. I was then unable to procure a sample of any sort, either ripe or green. I am now forwarding you some of these cherries in various stages of maturity. I am only too pleased to supply this sample to you, and I earnestly trust you will make these cherries a public exhibit to all of your passengers, as every person visiting any part of North Queensland should be conversant with this most dreaded fruit. Although very appetizing, they are most dangerous. I personally know of four cases of school children between the ages of 14 and 16 years becoming totally blind through eating this same class of Finger Cherry, and I now know the address of three of these people, all of whom are in manhood and still totally blind.

I may mention the name Finger Cherry was given to this cherry by the pioneers of the north, as they believed the loss of sight was caused by the juice of the fruit being put in the eyes from the eater's fingers, but medical men have since proved the loss of sight is caused from eating the fruit. So, Captain, you will readily realize the good you will be doing humanity by making as many as convenient conversant with this dangerous fruit.

With kindest regards to you and your most popular ship,

Charles E. Lucas, D.S.O., J.P.

ONLY THE BEST IS GOOD ENOUGH.

SIR: I was interested in your article on the choice of recruits for the medical profession, and especially by the remark that only the best would be good enough.

The question I wish to ask is, can the British Medical Association or senior members of our profession do anything to alter the present method of selecting the quota so that the best will be chosen? It is in my view, and that of many others, completely wrong that at present no student may transfer from the arts faculty to the medical faculty, however brilliant he or she may be. Students are informed that having commenced an arts course, they can never do a medical course, and this restriction applies also to returned service personnel who have an arts degree.

Surely it must be conceded that a cultural background is of inestimable value in any profession, and particularly in the medical profession.

An arts course of itself does not necessarily ensure that a student can earn his living. In some instances their services are utilized in private schools, but additional educational diplomas are required in government schools.

It is appalling to realize that responsibility to choose medicine as a career is thrown upon girls or youths no more than sixteen years of age. Many of our best doctors did not reach any measure of maturity at that age, and later on, after completing an arts or science course, found that their future lay in the medical world. These more mature students often did better than youngsters fresh from school.

Wartime quotas are necessary; however, our profession will suffer if the restrictions mentioned above are perpetuated.

Is it not apparent that too little regard is being paid to the ever-growing cultural and moral demands confronting doctors of today? Conversely, can we view with equanimity the present system which places paramount importance upon mathematics and science as a complete qualification for admission to the ranks of medical students?

Yours, etc.,

Armidale,
New South Wales,
August 22, 1944.

ELLEN M. KENT HUGHES.

Obituary.

JAMES FERDINAND RUDALL.

WE regret to announce the death of Dr. James Ferdinand Rudall, which occurred on August 18, 1944, at South Yarra, Victoria.

CHARLES ERNEST WASSELL.

WE regret to announce the death of Dr. Charles Ernest Wassell, which occurred at Brisbane on August 22, 1944.

REGINALD HAROLD BRIDGE.

WE regret to announce the death of Dr. Reginald Harold Bridge, which occurred on August 22, 1944, at Sydney.

ERNEST BRUCE SMITH.

We regret to announce the death of Dr. Ernest Bruce Smith, which occurred on August 24, 1944, at Toowoomba, Queensland.

JEFFREY WILMOTT WILKINSON.

We regret to announce the death of Dr. Jeffrey Wilmott Wilkinson, which occurred on August 22, 1944, at Melbourne.

Australian Medical Board Proceedings.

QUEENSLAND.

The undermentioned have been registered, pursuant to the provisions of *The Medical Acts*, 1939-1940, of Queensland, as duly qualified medical practitioners:

Clarke, Frederick George Joseph, M.B., B.S., 1943 (Univ. Sydney), Mater Hospital, South Brisbane.

Russell, John, M.B., B.S., 1939 (Univ. Sydney), 37, Barker Street, New Farm, Brisbane.

White, Percy James, M.B., B.S., 1944 (Univ. Melbourne), General Hospital, Brisbane.

TASMANIA.

The undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners:

Nolan, Philip, B.A., M.B., B.S., 1944 (Univ. Melbourne), Royal Hospital, Hobart.

Bean, Roy Herbert Donald, M.B., B.S., 1944 (Univ. Melbourne), General Hospital, Launceston.

Waterworth, David Henry, M.B., B.S., 1940 (Univ. Melbourne), Hobart.

Fordyce, John Leys, M.B., B.S., 1944 (Univ. Melbourne), Launceston General Hospital, Launceston.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Smith, Sidney Ernest, M.B., B.S., 1940 (Univ. Sydney), Main Northern Road, Castle Hill.

Bowen, Janet Mora Campbell, M.B., B.S., 1942 (Univ. Sydney), 113th Australian General Hospital, Concord.

Fowles, Winifred Lambert, M.B., B.S., 1939 (Univ. Sydney), 19, Templeton, 33, Wolseley Road, Point Piper.

Medical Appointments.

Dr. Edward Joseph Ryan and Dr. George de Vleiger Thams, in pursuance of the provisions of *The Workers' Compensation (Lead Poisoning, Mount Isa) Act of 1938*, Queensland, have been appointed members of the medical board constituted by that act.

Dr. Alan Bruce Lilley has been appointed a member and the Chairman of the Hospitals Commission of New South Wales.

Books Received.

"Savill's System of Clinical Medicine, dealing with the Diagnosis, Prognosis and Treatment of Disease: For Students and Practitioners", edited by E. C. Warner, M.D., F.R.C.P.; Twelfth Edition; 1944. London: Edward Arnold and Company. 8½" × 5½", pp. 1196, with illustrations, some of which are in colour. Price: 30s. net.

"The Dental Surgeon's Handbook: Modern Dentistry in Daily Practice", by Marsell Bronner, D.M.D., and Max Bronner, D.M.D.; 1944. Bristol: John Wright and Sons Limited. 7¼" × 5", pp. 256, with illustrations. Price: 21s. net.

Diary for the Month.

SEPT. 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.
SEPT. 6.—Western Australian Branch, B.M.A.: Council Meeting.
SEPT. 6.—Victorian Branch, B.M.A.: Branch Meeting.
SEPT. 7.—New South Wales Branch, B.M.A.: Special Groups Committee.
SEPT. 7.—South Australian Branch, B.M.A.: Council Meeting.
SEPT. 8.—Queensland Branch, B.M.A.: Council Meeting.
SEPT. 8.—Victorian Branch, B.M.A.: Legislative Subcommittee.
SEPT. 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 12.—Tasmanian Branch, B.M.A.: Branch Meeting.
SEPT. 15.—Victorian Branch, B.M.A.: Ethics Subcommittee.
SEPT. 18.—Victorian Branch, B.M.A.: Hospital Subcommittee.
SEPT. 18.—Victorian Branch, B.M.A.: Finance Subcommittee.
SEPT. 19.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 19.—Victorian Branch, B.M.A.: Organization Subcommittee.
SEPT. 20.—Western Australian Branch, B.M.A.: Branch Meeting.
SEPT. 21.—South Australian Branch, B.M.A.: Council Meeting.
SEPT. 21.—Victorian Branch, B.M.A.: Executive Meeting.
SEPT. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
SEPT. 22.—Queensland Branch, B.M.A.: Council Meeting.
SEPT. 26.—New South Wales Branch, B.M.A.: Ethics Committee.
SEPT. 27.—Victorian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch **(Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.**

Victorian Branch **(Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.**

Queensland Branch **(Honorary Secretary, B.M.A. House, 235, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.**

South Australian Branch **(Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.**

Western Australian Branch **(Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.**

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